Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XV.---No. 2. [NEW SERIES.] NEW YORK, JULY 7, 1866. $3 per Annum, [IN ADVANCE.]

Improved Steam Boiler.

The hindrance of the deposition of sediment and scale in a boiler, by a circulation of the water during the process of steam generation, and the utilization of a large amount of the heat, are objects worthy the attention of all who desire to render the use of steam power more general and effective than heretofore. Such is the design of this new boiler.

The accompanying illustration shows a vertical section of the boiler, and the explanation can be readily understood by reference to its several parts as designated by the letters.

This boiler consists of a cylindrical shell, with an internal fire-box, also cylindrical, the two being connected together by stay bolts in the ordinary manner. From the crown sheet of the fire-box is suspended a water leg, A, the exterior surface of which is armed with a series of bent pipes, B, opening into its interior at both top and bottom. The products of combustion are carried off by vertical tubes, C, passing from the crown sheet to the top of the boiler, where the stack is commenced, with an inverted funnel covering the whole; or, in the case of boilers of large size, a smoke box is formed of brick-work communicating with the chimney at the side.

The bottom of the water leg is connected with the exterior water space by means of horizontal tubes, D, which assist the circulation of the water. Opposite the end of each of these, in the external shell, is a hand-hole, E, which may be used to clean them, or to draw out any scale or dirt from the bottom of the leg. A steam drum, F, of any convenient form, is attached to the top or at the side of the boiler, as the case may require.

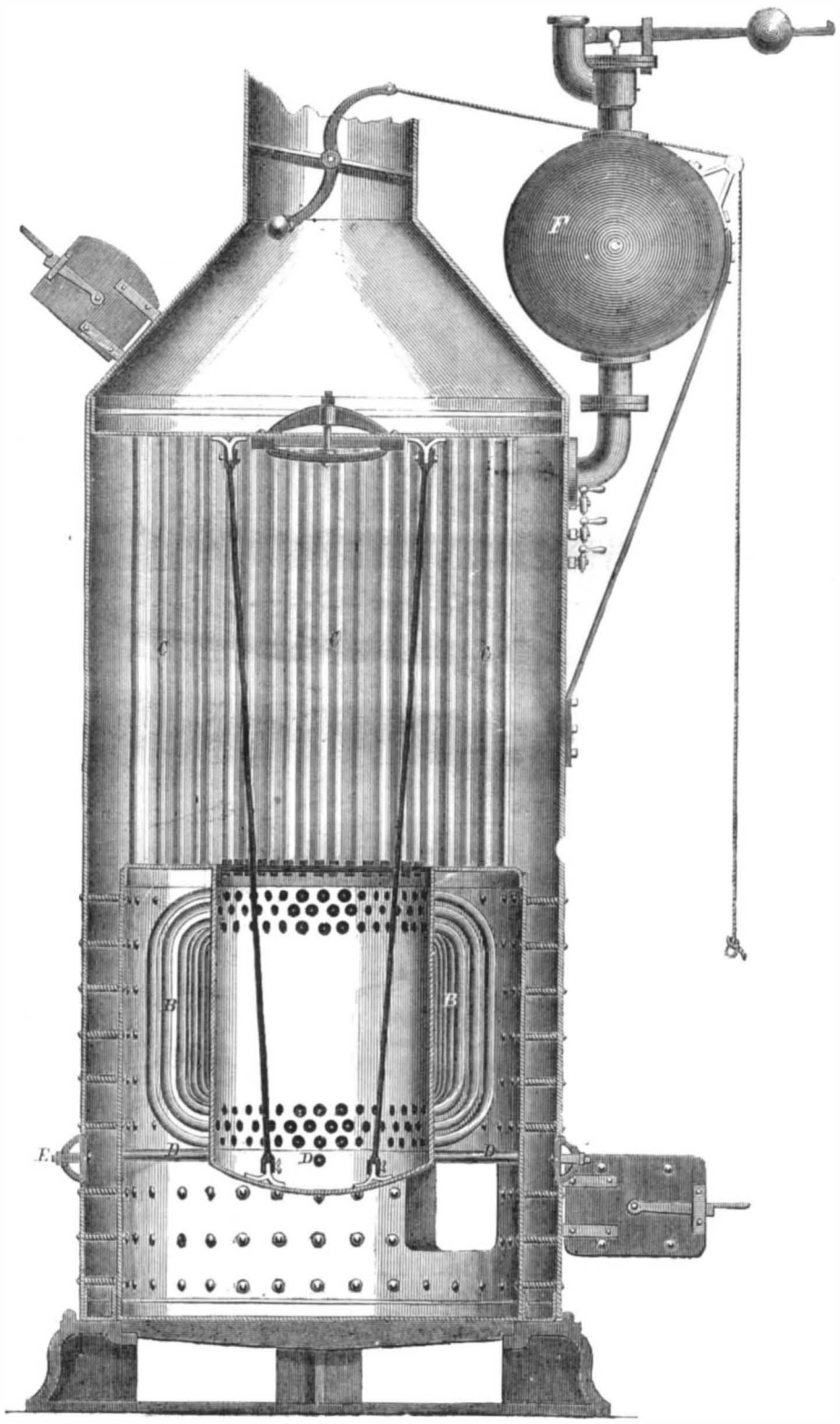
The principle of construction is equally applicable to large or small boilers, and it has been thoroughly tested, and with very satisfactory results, in both. It is readily repaired in case of the tubes giving way, by taking out the horizontal pipes which join the water spaces, and disconnecting the interior leg at the crown sheet. The connection at this point is made by means of a cast-iron ring with gasket and screw bolts, which, being in the water space, are protected from fire, and the joint can therefore be readily broken, and the whole leg, with its attached water pipes, dropped down into the pit below, where it can be worked upon on all sides. The horizontal pipes are easily replaced by means of the hand-holes in the shell.

The advantages of this arrangement are in the interior fire-box, in which no heat is lost by contact with brick-work; in the thorough circulation of the water of the boiler, secured by the water tubes surrounding the water leg; and by the horizontal tubes connecting the exterior and interior water spaces; in the entire consumption of the fuel, and exhaustion of the heat, caused by the ample size of the combustion chamber, as shown by the fact that the gas, when leaving the boiler, is comparatively cold, and in the superheating of the steam by the tubes at the top, passing through it for a short distance after leaving the surface of the water.

The effect of the circulation of water in this boiler is such that, in those which have been for some time in use, it was found that although the water used was impure, the interior of the boiler was clean and free from scale.

Those conversant with the subject will readily understand that the large fire surface and rapid circulation of water, secured in this contrivance, must produce great economy in the use of fuel, and this has, in fact, been found to be the result. In addition to this, the boiler has the great advantage of being compact and readily handled. It requires no brick-work to set it, and is therefore recommended for shipment to the South or to distant points, where brick and lime are difficult to procure.

It is also especially recommended for use in portable boilers for drilling, pumping, hoisting, etc. Address, for further information, James Connery, care Robt. H. Barr & Co., Wilmington, Del.



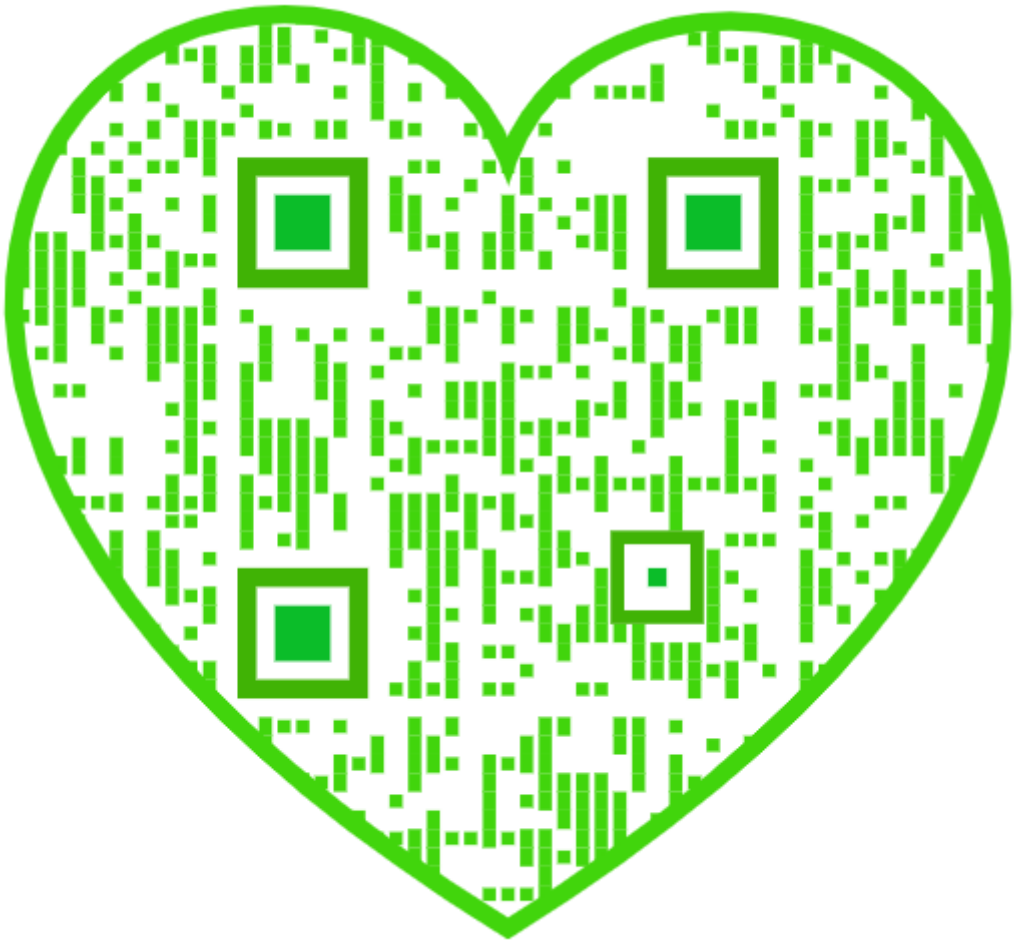
CONNERY & PENNYPACKER'S STEAM BOILER.

Locomotive Boilers.

At the meeting of the Mechanical Engineers, held at Birmingham on the 3d May, a paper was read by Mr. William Kirtley, of Derby, "On the Corrosion of Locomotive Boilers, and the Means of Prevention." Mr. Kirtley alluded to the corrosion which occurs in boilers made with lapped-joints, and attributed the grooving action which takes place to the fact that neither the plates themselves nor their attachments to the fire box and smoke-box are in the direct line of the strain that is put upon them by the pressure of the steam. The furrowing action is most marked at the interior of the smoke-box end of the barrel, where it occurs most frequently opposite the edge of the outside angle-iron ring, when such a ring is used, and along the edge of the inside laps at the longitudinal and transverse joints. As stated the result of the strain produced by the pressure of the steam within a lap-jointed boiler is, that a slight springing or bending of the plates takes place at the edges of the joints each time that the pressure is applied, the continual variations in the pressure causing this bending action to be continually going on when the boiler is at work. By this action the coating of scale, which is deposited upon the plates by the water, and which, to a certain extent, would protect the plates from corrosion, is detached at the points we have mentioned, and a fresh surface is thus continually exposed to the action of the water.

To avoid the defects above mentioned, the boilers

© 1866 SCIENTIFIC AMERICAN, INC.



of the locomotives on the Midland Railway are now made with welded longitudinal joints, and the three rings of which each barrel is composed have their abutting edge turned in a lathe, and are united by double-riveted butt-joints, the covering strips being hoops shrunk on, and all the rivet holes being drilled after the plates and hoops are put together. The plates forming the rings are rolled with thickened edges, a long gradual taper uniting the thick edges with the main body of the plates. At the smoke-box and fire-box end of the barrel, the rings are flanged outward, so that no angle-iron rings are required to join the barrel to the fire-box casing and smoke-box tube plate. Special machines are employed to bend and flange the thickened edge plates. The flanging is effected by laying the plate upon a flat bed, with the portion that is to be flanged over projecting; this part of the plate is then bent down by the descent of a roller. The rolls used for bending these plates have a deep groove formed in them at one end to receive the flange, the width of the groove being adjustable by a large screw and nut. Each ring is formed of two plates, and after these have been welded up, the ring is blocked to the proper diameter and the soundness of the weld tested by means of an ordinary hydraulic wheel-tire block-press.

A series of experiments which have been made upon these welded joints show that their average strength is within one-eighth of that of the solid plates; and in more than half the number of strips of plate which have been cut out across the weld and tested by a tensile strain, the fracture took place in the solid plate, and not in the weld. A number of boilers with welded seams have now been in use on the Midland Railway for some years; they are found to be in good condition, and they have, as yet, shown no sign of furrowing, even at the flanged ends, at the points where the grooving action was most marked in the boilers connected to the smoke-box, tube-plate, and fire-box casing by angle-iron rings. Mr. Kirtley exhibited, on the occasion of the reading of his paper, a number of specimens of corroded plates cut from boilers of the ordinary construction; samples of the thickened-edged plates, flanged and bent, and pieces of welded plate that had been broken in testing the strength of the welded joints, were also shown.—*Engineering*.

WHY A GUN BECOMES HOT ON FIRING.

BY PROFESSOR CHARLES A. SEELY.

When a gun is fired a fierce flame issues from the muzzle, and there is little doubt that this flame was preceded by one still more intense in the confined space of the barrel. As there is manifest here an abundance of heat to warm up a mass of metal like that of the gun, people have readily and unanimously come to the conclusion that the heat of a gun, on being fired, has come directly from the combustion of the powder—the heat is absorbed at the interior surface and from thence is conducted throughout the metal according to the familiar laws. Nevertheless, this popular theory is not altogether sound; I may show that it is quite fallacious.

It is a long time since I have had experience with guns, but I remember quite distinctly that a gun gets warm very quickly. As I have had within a few days no opportunities for experiments, I have consulted many of my military friends on their experience in firing large and small guns, and find that their testimony generally agreed with mine, that a gun becomes perceptibly warm on the outside instantly on firing. Can heat travel through a mass of iron or any other metal instantly? Iron is among metals a very poor, slow conductor; if the conducting power of silver be represented by 100, that of copper will be represented by 74, and of iron by 13. The popular theory fails, because metal cannot conduct heat fast enough to satisfy it.

But before being conducted the heat must first be secured? How difficult this is will be apparent when we realize the small surface exposed to the burning powder compared with the mass of metal, and how very short the exposure is. The contact of the inflamed powder with the metal is only for an instant. There is often no perceptible interval between the explosion of the cap of the powder and the appearance of the flash at the muzzle. Can any great quantity of heat be communicated to a mass of metal in such a little space of time? I have plunged my hand for an instant into molten iron with perfect impunity. A bar of iron may be thrust through a flame many times without becoming perceptibly warm.

I think it quite manifest, from such considerations, that a gun does not receive all its heat from the heat of combustion; the combustion theory does not account for the rapid diffusion of the heat through the metal nor for its great amount.

Another source of heat, of which all know something, and which will relieve us of difficulty, has been overlooked by military men; I allude to the heat of percussion. If a piece of iron be laid on an anvil and struck a few smart blows with a hammer, it becomes hot; the rectilinear motion of the smith's arm is tranferred to the cold iron and in it becomes an undulatory motion of the particles of iron, and the iron is hot. In this case it will be observed that the part under the hammer becomes hot instantly, and is heated almost uniformly throughout. In the case of the gun are there not the same essential conditions—the percussion, the instant heating, and the heat throughout the mass? In short, I am of the opinion that if we could have the expansion of gunpowder, without any heat of combustion, we might still have practically nearly as much heating of guns as now.

The expansive force of fired gunpowder has been estimated all the way from 15,000 (Robins) to 1,500,000 lbs. (Rumford) to the square inch. Should not this force produce as much heat as the fall of a collossal hammer of a corresponding weight?

The force of the recoil of a gun is never so great as the force which proceeds from the muzzle, and carrying the shot. Is it possible to show that the heat of percussion bears some definite relation to the difference of these? A unit of heat represents 772 foot-pounds.

The friction of the charge, in its passage from the gun, of course, contributes to the heating, but the amount of heat so produced must be quite small compared to the heat of percussion.

[From our own Correspondent].

Foreign Scientific News.

LONDON, Wednesday, June 6, 1866.

Last night a testimonial, in shape of three thousand guineas, was presented to Capt. Maury, late superintendent of the National Observatory at Washington, in recognition of the value of his meteorological researches to all maritime nations. When Capt. Maury left the United States for political reasons, he was warmly invited by the Grand Duke Constantine, of Russia, to take up his abode at St. Petersburg, and Prince Napoleon gave him a similar invitation in the name of France. Of the amount presented to him at the dinner last night, Holland subscribed £1,800, Russia £1,000, and the small remaining balance was made up by England and France.

Sir John Pakington, M. P., presided on the occasion, and among the guests present were the Mexican and Danish Ministers; Earls Nelson, Hardwicke, Grosvenor, and Powis; Admirals Sir John Hay, Young, Sir G. Back, Halsted, and Anson; Generals Beauregard and Walker; also Prof. Tyndall, Prof. Wheatstone, Commodore Jansen, Capt. Cowper Coles, and about a hundred others.

At the annual meeting of the Royal Geographical Society, last week, Sir Roderick Murchison, President, awarded the "Founder's" gold medal of the Society to Dr. Thomas Thomson, for his explorations in north-western India, among the mountains whence the Indus takes its rise, and for his researches in Thibet, and other parts of Central Asia. Dr. Thomson was the first to dispel the prevalent idea, entertained even by Humboldt, that Thibet was an elevated plain or plateau, and to trace the water systems, climate, and productions of that hitherto unknown region. For those researches Dr. Thomson, up to last week, never received any reward, and, in fact, in publishing his discoveries, was subjected to heavy pecuniary loss. The "Victoria" gold medal of the Society was then presented to Mr. William Chandless, for tracing, by his own unaided exertions, the river Purus, one of the largest tributaries of the Amazon, from its mouth to its sources. M. Du Chaillu next received 100 guineas from the Society, in recognition of the value of his recent researches in equatorial Africa. M. Du Chaillu, since his last visit to Africa, no longer describes the gorilla as a beast terrible to meet, as an animal that rushes roaring through the woods, gnashing its teeth, and beating its breast with its fists to produce a noise like the roll of a drum. On the contrary he now states that a whole drove of gorillas ran away when they saw him. The strictures of the English press on his first book of adventures have induced more moderate statements, yet it is but fair to M. Du Chaillu to state, that many of his disputed assertions about Central Africa, have been since substantiated as facts.

The *Great Eastern*, with the Atlantic cable on board, will leave Shearness on the last day of this month, and commence the laying operations about the 10th of July. She will be accompanied by the *William Cary*, steamship, 1,500 tuns, the screw steamer, *Medway* of 1,900 tuns, the *Albany* screw steamer 1,500 tuns, and the *Terrible*, man-of-war. The English Government will lend only one ship this time. In the attempt to raise the old cable, it is intended that three ships will grapple it at once, and the westernmost of them put on the greatest lifting strain, so that should it break the cable the other two ships will have a comparatively easy task to raise it, the strain being tak off one end of the loop.

As for the last expedition, Dr. Russell's book about it is of the most unsatisfactory description, and has been severely handled in this country. It has oozed out that in the picking up operations, last year, the incoming line of cable was subjected to sharp jerks, one every three or four minutes. The drum of the machine being a cylindrical form, the cable had to be what sailors call "surged" every few minutes, to prevent it from coiling itself off the edge of the drum. These facts have been suppressed in the book. The contractor's electrician, also, who had charge of the operations, has been, for some reason unknown, replaced this time by one of his juniors. As the Atlantic Telegraph Company had an electrician on board to report what he saw, the shareholders at one of their meetings demanded the production of his account of the engineering operations, and the directors refused the request. As it is customary in England for telegraph companies to print their engineers' reports, and post them to the shareholders, the secresy thrown by the directors over what might be a national undertaking, has brought down a great deal of unpopularity upon a noble enterprise, and it will be hard work this year to get up any enthusiasm in England, about the Atlantic cable.

An Extraordinary Railroad Disaster.

The great Northern Railway, of England, was the scene of an extraordinary casualty on June 14th, which is entirely unprecedented. It seems that a freight train broke down in a tunnel, and the precaution of flagging approaching trains having been neglected, one came along soon after and piled itself on the top of the freight train. Even this experience did not suffice, and a few minutes later still another train came in from the other end and dashed on top of the rest. This jammed the tunnel full to the very crown, and one of the engines having turned over, the coals fell out and set fire to the combustibles. For two days this fire burned unhindered, for the simple reason that it was impossible to check it. The noise of the fire, caused by the heated air rushing out of the confined place, is said to have been fearful. The immense traffic of the road was entirely stopped for the period mentioned. All this was caused by the simple neglect, in the first instance, of not flagging the coming trains. Only two lives were lost

Ryerson's Churn.

In the matter which accompanied the engraving of this churn, published on page 406 of the last volume of the SCIENTIFIC AMERICAN, the address of the inventor was incorrectly given as at *Princeton*, Ind. The real name of the town is Pierceton, Kosciusko Co., Ind.—the similarity of the two names causing the mistake. This churn will be found to expedite the laborious process of churning very much.

© 1866 SCIENTIFIC AMERICAN, INC.

[From the Galaxy.]

THE SPECTROSCOPE AND ITS REVELATIONS.

BY PROF. HENRY DRAPER.

Within the last few years a new form of chemical analysis has arisen, which ascertains substances by observation upon the color and properties which they impart to flames during combustion. It has been long known that the combustion of certain bodies gave certain colors to flames; strontia, for example, affording the beautiful crimson so well known in pyrotechny But no sure method existed of using the facts of combustion for chemical investigations, until the invention of the spectroscope. Spectrum analysis enables us to detect the minutest trace of the constituents of substances burnt. It has already discovered several unsuspected new metals; has given us the pov er of analyzing bodies whose composition we had not the means of ascertaining, and has proved to us that many of the elements of the earth are present in the inaccessible sun, and even in those more remote stars whose distance the most refined researches of astronomy cannot determine.

The spectroscope is merely a prism to which light can be admitted through a slit $\frac{1}{32}$d of an inch wide, with apparatus for examining microscopically the spectrum or decomposed ray beyond the prism. When this is done, the spectrum is found to be crossed by an infinite number of lines perpendicular to its length, as shown in the upper part of Fig. 2. These lines are called, from the name of the distinguished optician who discovered them, Fraunhofer's lines.

When the light, coming from a white-hot mass of metal is examined by the spectroscope, its spectrum is found to be perfectly continuous and unbroken by any Fraunhofer lines. This fact was demonstrated by my father, Prof. J. W. Draper. in 1847. What is the cause of the lines in the solar light, and in what does that luminary differ from the incandescent mass?

In order to fathom this question, we must investigate for a few moments the case of artificial lights, such as ordinary flames, and those in which there are purposely introduced various elementary or compound bodies. The construction of the spectroscope must also be described.

The spectroscope is some times a very complicated instrument, but, for ordinary analysis, quite a simple form may be used. The one represented in Fig. 1 is commonly found in laboratories. It consists of a prism, P, supported on a stand, F. Two telescopes of low magnifying power, A and B, are attached by suitable supports. One of these, B, is furnished with an eye-piece like any common spy-glass, but the eye-piece of the other, A, is removed, and in its place is put a vertical slit, *e*. Opposite this slit the flame to be examined is placed. The light coming through the slit from the flame falls upon the object glass of the first telescope, and its rays are rendered parallel; it then passes through the prism, is refracted and decomposed, and enters the second telescope, whence it falls upon the eye. Any flame may be put opposite the slit, and its peculiarities examined, or, by the aid of a reflector, the sunlight may be cast on part of the slit so that we can see a solar spectrum alongside of the flame spectrum. Or we may have the spectra of the two flames, D and E, at once and compare them. The third telescope carries a scale.

The use of a spectroscope merely involves placing the substance to be examined in a spirit or gas flame, and then looking through the telescope to examine the spectrum. The number, position, and color of the transverse lines are always the same from the same substance. A person soon becomes experienced enough to state in a moment what bodies are present.

If, for example, a piece of soda be suspended in the flame, at once a double yellow line makes its appearance, as shown in Fig. 2, by the double line near the right-hand end of the third spectrum from the top. The wood cut shows also the lines characteristic of the elementary bodies, potassium, lithium, rubidium, cæsium, strontium, calcium, barium, thallium. The spectrum at the top is that of the sun, and is inserted for the sake of comparison. By noticing where the lines in the lower spectra fall, and collating them with the solar spectrum, their color may be ascertained from this cut. Those at the right-hand end are red, those at the left violet, those in the intermediate parts of the intermediate colors.

Understanding, then, that various elementary bodies, when volatilized in a flame and examined by a spectroscope, give spectra distinguished by bright-colored lines, soda by yellow, strontia by red, etc., the reader is ready to grasp the next idea in the investigation.

If the light coming from such a source as a mass of white-hot iron, which is free from all Fraunhofer lines, be passed through a flame where soda is volatilizing, before it is analyzed by the prism, instead of seeing the bright yellow lines characteristic of the soda, we shall find in their place two dark lines. In other words, the soda flame has interfered with the continuity of the spectrum of the white-hot body, and produced therein two Fraunhofer lines. If a number of substances are burning in the flame at once, we shall get in the spectrum an increased number of lines. A flame refuses to permit the passage of rays of the same kind as it emits. White light passing through a soda flame has the yellow rays sifted out of it.

It is obvious at once, from such considerations, that we can ascertain the constitution of the sun, both as regards his physical character and chemical composition. From the fact that the lines in his spectrum are dark, we infer that he has an intensely hot solid or fluid nucleus, emitting light and surrounded by an atmosphere of flame in which there are many volatilized bodies. If he were solely an ignited gas or flame, the lines of his spectrum would be bright instead of dark.

As regards chemical composition, it is only necessary to ascertain what elementary substances can produce lines correspondlng to those in the solar spectrum. We can then at once be sure that those bodies exist in their luminary. The presence of iron, sodium, and a variety of other materials familiar to us here, has thus been proved.

The reader will at once perceive what an important bearing these facts have on the construction and unity of the solar system. We have shown that on two members of it—the sun and the earth—the same substances are found, and may, therefore, infer that all the rest are similarly composed—for no other two, at first sight, seem more unlike. The sun, and all his attending planets, with their satellites, are composed of the self-same elements.

In this place, it is interesting to refer to a theory by which such facts may be accounted for, and the reason of the similarity shown. The nebular hypothesis assumes that our solar system was at one time a gaseous mass, extending beyond the orbit of the furthest planet, Neptune. Its composition was necessarily uniform throughout, for the tendency of gases to diffuse into one-another, or intermingle, would have free play. In this nebula the temperature was very high, for the elementary bodies were in a vaporous state in it, just as they are at present in the sun. But as soon as the mass commenced to lose its heat, there were established currents and a general movement of rotation, and on the exterior a shell, or, rather, equatorial band of condensed materials, began to form. The cooling and consequent contraction still continuing, the band was left behind, but it sooner or later broke, in one or more places, and aggregated into one or more globular masses, which continued their rotation as planets.

The same thing occurring several times in succession, and rings of molten matter being left behind by the contracting gaseous mass, as it lost its heat, eventually all the planets, as we now see them, were formed, and the remainder of the nebula is the sun, still preserving the form partly of ignited gas, and partly, probably, of a liquid or solid. It is, however, even now radiating its heat away and cooling, though slowly. After, perhaps, giving off a few more planets, whose orbits will not exceed in diameter his present size, the sun, according to the hypothesis, will be no longer visibly hot, and life on the planets will come to an end.

This celebrated hypothesis has been very freely discussed, and has received much adverse criticism. Many strong objections have been urged against it, but the spectroscope confirms it. The reader will not be able to appreciate the full value of this support until the constitution of the nebulæ visible in the heavens has been spoken of. It will, therefore, be reserved for that place.

But let us not confine ourselves in these observations to our own solar system. Let us see whether this little instrument, which is scarcely any thing more than a small triangular piece of glass, will not enable us to establish a relationship with more distant bodies than the sun and planets—with other solar systems far away in the abysses of space.

To the naked eye, there appear scattered over the sky at night a multitude of stars of various colors. Even in our best telescopes they are only glittering points, and no glimpse of their chemical constitution could be presented before the spectroscope was applied to investigate them. We were satisfied that they shone by their own light, that they were suns, that they presented many analogies to our solar system, and also many dissimilarities.

How strange a sunlight, for instance, there must be in a world lighted by a pair of differently colored suns, for such must be the case if planets revolve around some of the binary stars. At one season of the year, a blue sunrise, followed by a yellow one, then a day of the intermingled lights—a yellow evening and dark night. At another season the reverse order of illumination; while at intermediate times there may be continuous day, first of one color, then of the other; a yellow day inciting the growth of plants, a blue one delighting the photographers. Can we establish a connection with such worlds?

The stars, both single and double, when examined by the spectroscope, are observed to contain substances well known to us. One of them, Arcturus, closely resembles our sun, as has been shown by Rutherford. At once we perceive a fellowship between them and our own earth, and are led to the noble idea that Nature constructs everywhere out of the same materials. Bodies, so distant that the astronomer fails to give us an idea of their remoteness are brought, as it were, into our grasp, and are analyzed with certainty. We recognize the same elements in them, that compose the soil we tread, the water we drink, the air we breathe.

And what are these materials? Chemists enumerate to us sixty-eight elementary bodies, that is, substances not composed of anything else, and that cannot be further decomposed. Such are the gases: oxygen, nitrogen, hydrogen, etc.; the liquids: mercury, bromine, etc.; the solids: sulphur, iron, gold, etc One is fifteen times lighter than the air, another twenty-one times as heavy as water. Truly, Nature has variety enough to choose from, for out of sixty-eight elements how many combinations may not be made? But this very variety creates at once a suspicion that the ultimate elimentary bodies are not in fact so numerous.

Among the reasons for doubting the multiplicity of elementary bodies, it may be stated: 1st, That many of them are so nearly identical that it requires a good chemist to distinguish one from another. 2d, That in our own times a number of elements have been stricken from the list, having been found to be compound bodies. 3d, That by quite trivial means one elementary substance may be made to assume a form having properties totally distinct from those it originally possessed. 4th, That we can form, from two or more elements bodies, which have the atributes of elements, a case in point being cyanogen. 5th, That the infinite variety of organic substances, such as the various tissues of the bodies of animals and plants, diverse as they are, are all formed principally from four elementary bodies. A multitude more of such arguments might be advanced; but the general conclusion which they indicate can be summed up in a line. All the sixty-eight elements may be compounds of perhaps only two or three elements—may even be modifications of a single type of matter. But any further consideration of this part of the subject would lead us into an examination of the nature of matter, and its atomic constitution, and with that we have not room to deal.

But we will penetrate yet a step further into space. The stars, it has been stated, are exceedingly remote. Let us examine bodies so distant that the stars are near neighbors compared with them. Clusters, resolvable nebulæ, true nebulæ, shall carry us as far from the earth into space as the eye can see.

To the naked eye, or in a telescope of low magnifying power, there are visible in the sky certain patches of diffused light, differing in appearance from the glittering stars. Some, when examined with a higher power, are seen to be resolved into an

© 1866 SCIENTIFIC AMERICAN, INC.

aggregation of stars; some, by the use of the highest attainable magnifying power, on the finest nights, are with difficulty resolved, while some resist every attempt. It is with the last that we are more particularly concerned.

The great reflecting telescope of Lord Ross is well known. It is six feet in aperture and fifty-four feet in focal length. By its aid, nebulæ that had, up to his time, been unresolved, were separated into stars, and from this circumstance the argument was advanced that all nebulæ would yield to a sufficient increase of power and be demonstrated to consist of stars, which, while in reality separated by immense distances, yet seem so closely packed together that their light is blended into one mass.

We have spoken of solar systems; there are, according to these statements, also stellar systems where, instead of a sun and planets, there are groups of suns. Our sun belongs to such a group of resolvable nebulæ, the stars that we see individualized, and those of the milky way, being his companions.

Seen at a great enough distance, our nebular or stellar system would present a flattened or lima-bean-like shape, somewhat elliptical from one point of view, and like a narrow band from another. Is this group arrangement the only form in which luminous matter is found in the universe?

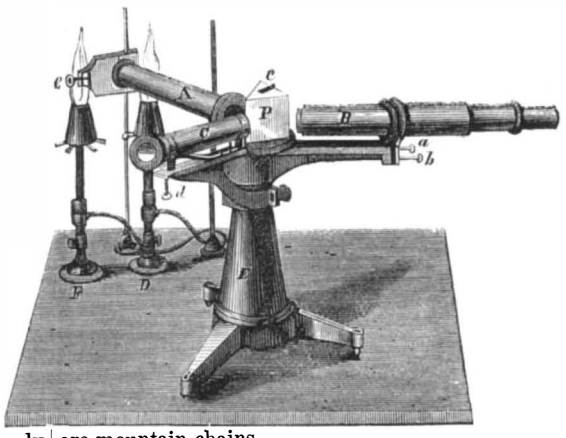
Here, again, the power of means apparently trivial, but rightly applied, is shown. Once more the prism of glass solves a question which hundreds of thousands of dollars expended in telescopes could not have settled. On applying the spectroscope to the investigation of the irresolvable nebulæ, Huggins finds that some of them present the spectra characteristic of an ignited gas, that is, of a flame. The Fraunhofer lines in that case are, as we have said, bright instead of dark, as in the solar spectrum, and the evidence is of a very tangible and unmistakable kind.

There are, then, in space, masses of ignited gaseous matter of prodigious extent, shining by their own light, containing no star and resembling the nebulæ, which the nebular hypothesis declares to have been the original state of our solar system.

Now we can appreciate the assistance which the spectroscope has lent in establishing that noble conception of Herschel and Laplace. It has demonstrated the unity of the solar system by establishing the existence throughout it of the same elements; it has shown the same unity in the materials of the universe; and, lastly, it fortifies us in the belief that that theoretical conception is in process of realization before our eyes; that we may see worlds in the act of formation. The spectroscope has also a bearing on a great geological hypothesis: the former heated state of our globe. Geologists assert, from the presence in high latitudes of the fossil remains of tropical plants, that the earth was once in a molten condition; that it cooled gradually, and at one time reached such a temperature that the internal heat sufficed to maintain a warm climate on every part. The polar regions were not then dependent on the sun for their supply of heat, but needed that luminary only for light. Vegetation was somewhat like that of a hothouse in the north in winter, with plenty of heat, but lacking light for part of the year.

By this hypothesis, a great variety of facts, such as the formation of some mountain ranges, may be satisfactorily explained. For example, when the heated mass of the earth was cooling it was also shrinking, but as soon as an inflexible crust had formed over the liquid ball, that exterior could no longer gradually diminish in circumference, but was forced to pucker into ridges, just as we see in the case of an apple drying up. The apple assumes a wizened appearance, so did the earth. The wrinkles are mountain chains.

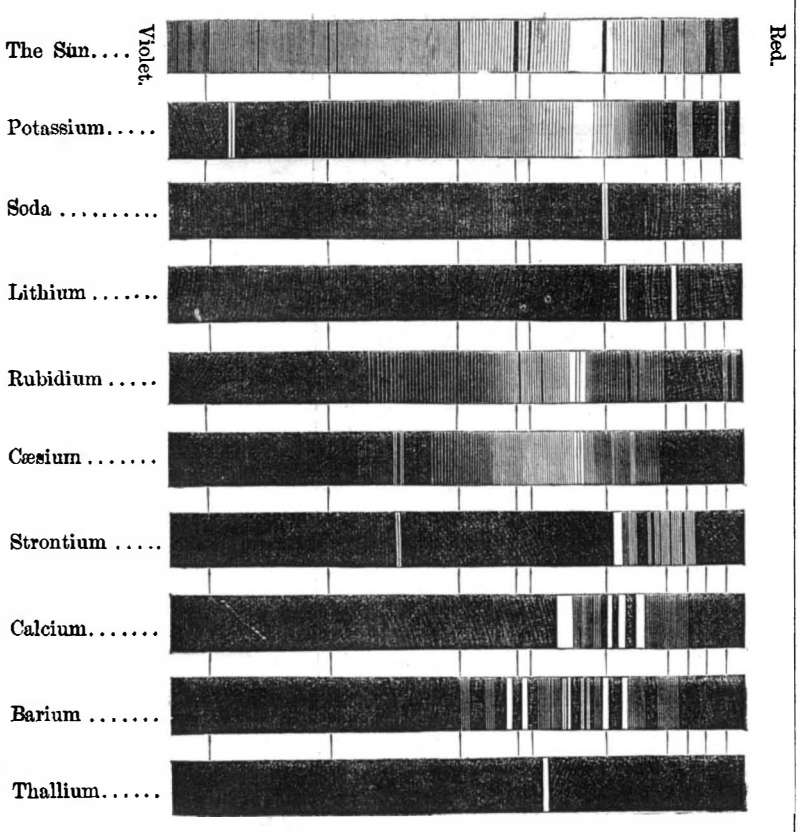
Fig. 1.



The spectroscopic confirmation of these ideas, though indirect, follows necessarily from the support which that instrument lends to the nebular hypothesis. If the earth was once an ignited gas, it is certain that it also presented subsequently a molten form. And its geometrical shape, that of an oblate spheroid, the figure naturally assumed by a rotating liquid mass, is an important link in the chain of evidence.

Another reflection naturally suggests itself to any one thinking about these matters. We know that heat was the force concerned in keeping the materials of our solar system in the gaseous state, for by its aid we can again bring most of them into that form.

Fig. 2.



The escape of heat was the cause of the solidification of the present crust of the earth. Where has all that immense amount of heat gone to?

It escaped altogether as radiant heat, moving in straight lines. Is it lost in the abysses of the universe, or is it somewhere collected together to melt worn-out worlds into nebulæ again, and cause them to run again the course they have before pursued? Can we discover the scheme by which perishing systems are replaced by new ones, and the grand East Indian idea, of a multiplicity of worlds in an infinity of time, realized? How, when the light of our sun has faded out, shall our solar system be revivified, and re-supplied with the force it has lost? These are questions that remain to be solved. We are satisfied that matter and force are eternal, but what their laws of distribution and operation in space and time are, the intellect of man has yet to discover.

And if there has been a gradual formation of planets within our solar system, beginning at its confines, one after another losing its internal heat and becoming dependent on the sun for warmth, does not another thought occur to us? Has not life followed the inward march of heat? Is it not possible that there was a time when plants and animals, such as we have here, were able to exist on the exterior planets, favored by their genial heat? The last traces may not have disappeared from them. And may not the types of low forms of organized things, that inhabited this earth in early geological times, have passed inward toward the sun, where surrounding physical conditions favored them in a manner that has ceased here? Are there on Venus the radiata, mollusca, etc., belonging to our planet ages ago? Do types of life exist in the more distant planets, of some grade higher than our own? We see on the earth the migrating animals that cannot stand the vicissitudes of summer and winter, follow the sun southward in winter, and driven before him northward in the summer. Is there in the solar system a similar obedience to heat and its effects, and an ever inward flowing tide of life?

A Great Railway Enterprise.

The Imperial Mexican Railway, connecting the capital city with Vera Cruz, a distance of 350 miles, is one of the greatest railroad enterprises ever undertaken. In a distance of 55 miles an elevation of 7,000 feet is to be overcome, corresponding to 119 feet per mile, or 2 feet in every 44½ feet throughout the whole distance. The most abrupt ascent ever before achieved was that on the Copiapa line in Chili, 196 feet per mile in 17 miles; but the chief incline of the Mexican Railway, at Maltrata, will overcome 211 feet per mile in a distance of 23 miles. In achieving this part of the work, the engineers have been called upon to construct over the river Metlac, midway between the cities of Orizaba and Cordova, a viaduct which, when completed, will surpass any structure of the kind now existing in the world, and will, of itself, be worth a trip to Mexico to see. This viaduct, to consist, of an iron bridge, now nearly completed in England, will carry the road over the Barranca de Metlac, at the enormous hight of 380 English feet, being nearly 150 feet higher than any such work now extant. One hundred and sixty miles of this road will be opened this month, and the whole is under contract to be completed on the 30th of April, 1869. The road is built under the superintendence of Col. Andrew Talcott, an eminent American engineer.

Variable Star.

In a recent issue we noticed the discovery of a variable star in the Constellation of the North Crown. Rear-Admiral Davis, in a communication to the Secretary of the Navy, gives full credit to Mr. Farquhar, of the Patent Office, for the first discovery of this star. The *Compte Rendus* states that the same star was observed at Rochefort, France, on the night of the 13th of May—only one day later than its discovery by Mr. Farquhar.

A GLASS-MAKERS' convention was recently held at Philadelphia, all the leading concerns being represented. It is said that the glass-manufacturing business has been so much injured by the low rate of tariff put upon imported manufactured glassware, that many shops have been compelled to suspend operations entirely, and the others have so little encouragement to continue the business that but a small number of hands are employed. The ware can be imported, and after payment of duties, sold at a less price than our manufacturers can afford to make it. It is desired by them that Congress raise the tariff on this article of importation.

AT the recent meeting of the American sharpshooters association, at Chicago, Gottlieb Fahlni, of Morgansfield, Ky., won the first prize, making twenty-five shots within a circle four inches in diameter at a distance of 700 feet.

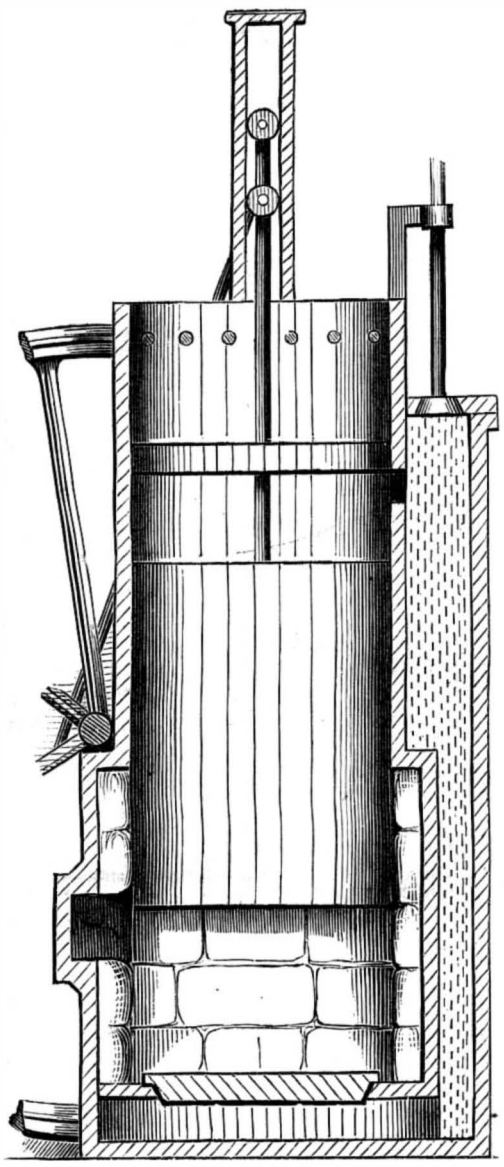
© 1866 SCIENTIFIC AMERICAN, INC.

McDONOUGH'S CALORIC ENGINE.

(Communicated.)

This machine consists of a cylinder, open at the top and closed at the bottom. The furnace is at the lower end of this; a plunger moves in it above the fire, and also a piston at the upper or open end. The air to feed the fire is drawn into the cylinder through holes in its periphery, which are uncovered when the piston is at the upper end of its stroke. The plunger moves the air through a side pipe and under the fire. It expands and does its work by forcing the piston upward, after which the plunger expels it through an exhaust valve near the top of the side pipe.

By this arrangement only cold air reaches the piston, and as all the parts affected by heat are covered with fire-clay, it forms a durable machine. The engine, which the engraving represents, has furnished a power of more than six pounds per inch to a fifteen-inch piston, of eight inches stroke, 150 revolutions per minute—the power only acting one way—and consuming fourteen pounds of coal in four hours. The heat is utilized at more than 600 degs., probably, and escapes at 100 degs., being a step toward the development of a machine superior to the steam engine in economy of fuel.



Patented Jan. 30, 1866. Detailed drawings and castings furnished to persons wishing to build engines, ; address T. McDonough, Newburgh, N. Y.

To Prevent Chafing.

During the "hot term" persons of a full habit, who walk much, are inclined to chafe. This can be cured or prevented by the use, once or twice a day —at retiring and rising— of a solution of common alum in water. The alum may be dissolved in warm or cold water, but should be used cold, applied with a soft linen or cotton cloth to the parts affected. The proportions are a lump of alum large as a walnut to half a pint of water. If too strong, where the flesh is excoriated, weaken with cold water. We know by personal trial this simple remedy is effectual.

An Ancient Stove.

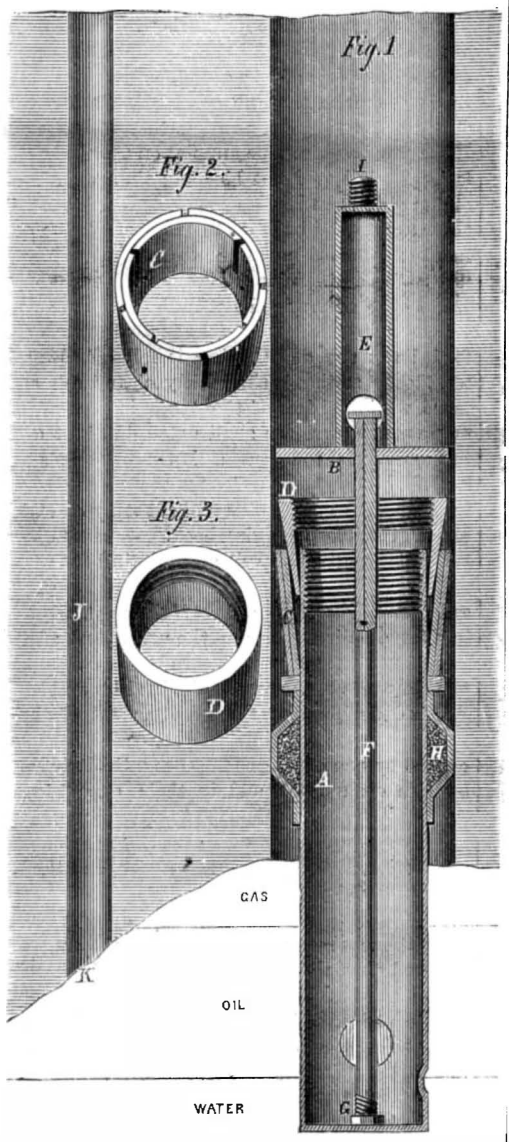
The oldest stove, probably, in the United States, is one which warms the hall of Virginia's Capitol in Richmond. It was made in England, and sent to Virginia in 1770, and warmed the House of Burgesses for sixty years before it was removed to its present location, where it has been for thirty years. It has survived three British monarchs; has been cotemporaneous with four kingly monarchies, two republics, and two imperial governments of France. The great Republic of America has been torn by internecine strife, the breaches partly healed, and still the old stove remains, unmoved in the midst of all.

CHRISTIAN'S DEVICE FOR OIL WELLS.

There are many who, having sunk wells for oil and lost all they possessed therein, would rejoice if the day of their mourning was changed to gladness by the sight of the coveted fluid welling up from the bowels of the earth, and the hollow bore, which seemed only a place to bury treasure, made to yield a thousand-fold for that which was lost in it.

The inventor of the apparatus here illustrated has a theory in regard to non-productive oil wells, and he claims that his arrangement will make a well that is now pumped, yield spontaneously, or flow of itself, without the labor and expense of raising the oil mechanically. The details are as follows:—

A is an iron pipe, or its equivalent, having flanges at B, and C is a slotted, double hollow cylinder, of copper or other suitable material. At D a hollow, wedge-shaped cylinder, of steel or iron, is shown; and E is a tube, having a flange at its base, connected by the rod, F, with the pipe, A, by a nut, G, at the bottom. The seed bag is shown at H.



The device is thus operated: the drill rod is screwed on at I, when the pipe, A, and its connections, are lowered to their place in the bottom of the well, and the weight of the drill rods allowed to rest for a moment on it; this secures the tube, A, firmly in the well. The drill rods are then turned several times round to detach the rod, F, from the tube, A, by unscrewing it at the nut, G; the tube, E, and the rod, F, are then drawn up out of the well with the drill rods. In the engraving a cavity in the rock is shown at the bottom of an oil well. As the gas arising from the oil is lighter than water, it will occupy the upper space in the cavity, and since the oil is lighter than water, it will float on the surface and remain between the two, if undisturbed; therefore, if a well is bored into the upper or "gas strata" of a cavity, the well will not be a flowing one, but will require a pump, but if this apparatus and its accompaniments are inserted in the well, as shown, down through the gas, into the oil strata, then a flowing well will be the result. Again, if a well is sunk (as shown at J, by the side of the engraving of the machine), a flowing well will be the result, for it penetrates to the oil itself; but when the surface of the oil becomes lowered, or is on a level with the bore, as at K, the flow will cease; then, it is claimed, if this machine and its accompaniments are inserted, as before described, reaching down to the bottom of the oil, and shutting off the escaping gas, a flowing well will be the result. As the oil generates gas constantly, wells that have been pumped for some time could possibly be changed into flowing wells in a short time, and at a trifling expense, by using this device.

Figs. 2 and 3 represent the construction of the copper cylinder, C, and the steel cylinder, D.

A patent was issued on the 22d of May, 1866; for further particulars address the patentee, John B. Christian, Mount Carroll, Carroll Co., Ill.

Glass Brick Mold.

A new mold for bricks is in use in Baltimore which is said to turn out most elegant specimens of pressed brick. The mold of wood is lined with plate glass, which forms a perfectly smooth surface and naturally gives excellent results. The cost of the mold is but little, if any, more than the ordinary wooden mold, and it can be easily applied to brick machines already in use. The brick comes out smooth, with perfect sides and edges, the mold being raised from the palette or plate on which the bricks are made. It has, we understand, given perfect satisfaction wherever used. Rights can be obtained of P. Murguiondo, Baltimore, Md., who is the patentee's agent for the United States.

Our New Dress.

We are somewhat proud of our new typographical costume. Our readers must have noticed in our last number, as they see in this, the sharp, clearly-cut appearance of our new type. It is from the type foundery of Messrs. Farmer, Little & Co., 63 and 65 Beekman street (formerly White's), and the font is as fine as any we have seen. Handsome clear type, on good paper, is a commendation to the matter of any journal, and we think the character of our paper deserves a handsome dress.

A FRIGHTFUL accident recently happened at a foundery in Scotland. A heavy casting was being made, when some of the liquid escaped, and splashing on the hands and arms of the workmen, caused them to quit their hold of the ladle, which immediately capsized, and the whole of the contents, some three tuns, was thrown on the workshop floor. All the men rushed for their lives to the door, but it could not be opened at once, and they turned in desperation, and actually ran through the molten metal. One fell as he ran, and was so disfigured that he was scarcely to be recognized, and his life, with that of one of the others, is despaired of.

MESSRS. ALPHEN, of Paris, are the most wealthy diamond merchants of the day. They lately presented a problem to the Academy of Science in the shape of a magnificent stone, worth $30,000; the question to be solved was the changed color in the stone. It is naturally of a yellowish tinge but on being slightly heated changed to pink. As this metamorphosis decreases the value of the stone one-half, they were naturally anxious to know the cause. The Academy declined giving an answer until they had examined the subject more fully.

COMPILATION OF THE EIGHTH CENSUS.—From Senator Morgan we have received the statistics of the Eighth Census relating to mortality, banks, insurance, railroads, canals, real and personal estate, the fisheries, the press, educational and religious statistics, and other matters.

© 1866 SCIENTIFIC AMERICAN, INC.

Correspondence

A Weak Steam Boiler.

MESSRS. EDITORS:—You will confer on us a favor, and, no doubt, do many of your numerous readers a kindness, by explaining through your columns why a boiler should fail under circumstances like the following:—

We made last month a boiler of charcoal No. 1 iron, 16 feet long, 60-inch shell, 60 four-inch flues, shell five-sixteenths, and heads three-eighths inches thick, of the same iron we usually make such boilers, hung on brick-work of arch by three cast-iron legs riveted to the boiler. It was tested with cold water at a pressure of 100 lbs., and was in all respects, so far as we could judge, an A No. 1 boiler. After running finely about 15 days, it began to leak in three joints over the fire, under pressure of about 60 pounds, the sheets gradually bagging, and in two or three days had settled down more than an inch, leaking so badly that the owners were compelled to stop its use. Our attention being called, we looked at it and declared it the result of firing up without water in the boiler, the owners as strongly asserting the contrary.

We took out all the sheets injured, replacing them with new ones of best fire-box iron, five-sixteenths thick, tested by 100 pounds cold-water pressure. Steam was again applied, and in a little more than one day the joints over the fire began leaking and the sheets bagging as before.

The grates in the first place were about thirteen inches below the boiler, and on the second trial about twenty inches below, the fuel used in both cases being Ohio coal screenings, and lake water to feed the boiler. The chimney is about 75 feet high and the draft strong, and the pressure on second trial at no time over 70 pounds.

We have been f r 15 years largely engaged in making steam boilers of this and other sizes, and have never before known such a case. We have seen several of our leading boiler makers and find two or three of them have had similar cases, and have no satisfactory solution of the matter.

[We suppress names purposely, as we presume our correspondent does not wish his failures advertised to the world.

The cause of the trouble is weakness of the boiler. It is not strong enough for its work. Bourne gives the following rule to ascertain the thickness of boiler plates to withstand a given pressure: "For a single riveted boiler, multiply the internal diameter of the boiler in inches by the pressure of steam in pounds above the atmosphere, and divide by the constant 8,900; the quotient is the proper thickness of the plate in inches."

From this rule it will be seen that the plates of the boiler are too thin for their work and they fail accordingly. Fairbairn gives a table of the strength of steam boilers, and the pressures they may be worked at; and for a boiler of 5 feet diameter and three-eighths plates (not five-sixteenths) he allows 70¾ pounds per square inch, but Bourne states that these figures are too high, and that a boiler so worked is not safe. He says that for double-riveted boilers the margin is large enough, but for single riveted the pressure is too near the ultimate strength of the iron. For a boiler 5 feet diameter the plates according to Bourne, should be 0·416 of an inch or about seven-sixteenths of an inch, and for this he allows 60 pounds per square inch.

These authorities are, we take it, sufficient. If the boiler in question is only one of many that have been made and worked successfully, it goes to show that good iron and good workmanship will permit the habitual use of a pressure far in excess of the safe load, or the duty that a plate is capable of bearing as ascertained from the strength of materials.

The Manchester Boiler Association, of England, a body composed of practical men who examine and insure steam boilers, recommends that in all such cases as the one here given, the shell should be strengthened by angle-iron flanges all the way round, at intervals of from two to three feet, according to circumstances.

It is not impossible that there may be deposits on the plates, and if this be so, then they must be burned or over-heated, and any practical man can tell whether this has taken place or not. It is also possible that the boiler is strained from the settling of the brick arch on which it is hung by three legs. As the front is the hottest, it may have given way at that point. These are mere surmises and conjectures, however, and of little value compared to the naked fact that the plates are thinner for a given strength than the best makers put in.—EDS.

Circular Saws.

MESSRS. EDITORS:—Having been engaged for the past fifteen years in building and running circular saw mills, permit me to make some statements in relation thereto. I have sawed lumber in the Granite State, among the sapling pines and second growth, and also among the giant poplars, oaks and walnuts of the West; I have been conversant with the entire series of saw mills from the original Page down to the present time My experience has taught me that, as with all other machines, the more completely the saw mill is divested of complicated appliances, especially if designed to meet imaginary difficulties, the more complete will be its success. That lateral motion for the saw, and throwing the saw from the log, in gigging back, are fallacies, is daily proven by thousands of mills that are successfully operated without; if a necessity ever existed for lateral motion it has disappeared in the present perfection attained in the manufacture of the saws.

When the saw has been hung upon a true mandrel, supported in solid bearings, and restricted, as is usual in all shafting, from any end motion (lateral to the saw) the inventor and manufacturers have performed their parts, the residue is within the province of the sawyer.

The front edge of the saw must be pitched into the log so much that no other portion of the saw shall touch the face of the log that it has dressed If the saw be quite true and flat on the side next the log, this pitch will not be more than one-sixteenth of an inch in the diameter of a sixty-inch saw, but if there are any bunches on the saw the pitch must be increased until they too are clear of the log. This "pitch" is an individual matter with each saw, and when once determined needs thereafter no change.

The back of the tooth must be filed square across, for it leads the saw, letting it fall off toward the next tooth, so that it shall fairly clear itself and no more, while the face of the tooth is dressed to that angle that experience shall determine best adapted to the material to be sawn. If the saw cuts a square kerf the nut and saw collar may be loosened, and the saw hanging on the pins will cut truly and will not scratch the log in gigging back.

I prefer setting as well as upsetting the saw, as a matter of economy, finding that the diameter of the saw is not reduced so rapidly if the teeth are sprung in alternate directions, and the upset used afterward merely to throw out a full corner than when the entire clearance of the saw is obtained by upsetting.

It is desirable that the management of the feed works and the "setting" of the head blocks be performed by one person, as they are intimately connected with each other, and in their expeditious and correct performance depend, in a great measure, the quality and quantity of the work to be done. The application of the feed, the gig-back, and the brake, must all be controlled by one lever, and the head blocks must be "set" accurately, simultaneously, and expeditiously by another lever, and they must be so situated that the sawyer may reach both without moving from his place. The feed works must be simple and effective, substituting friction for gearing, as far as possible, as permitting a more rapid gig-back motion than is otherwise possible. It is also necessary that the head blocks be at all times capable of a convenient, independent motion, for that is indispensable in the preliminary adjustment of the log and for other purposes. They must be of adequate strength to withstand the turning down of heavy logs in frosty weather, and yet not so heavy but that they can be readily lifted in adjusting them for logs of different lengths, and in which case they must be readily detachable from, and attachable to, the apparatus for communicating the simultaneous motion. The requisite strength and lightness can be only attained by the use of wrought iron as a material for the base of the head block.

I have endeavored to condense, into as few words as possible, the facts and rules that I am in the habit of using in teaching the use of the circular saw to those purchasing mills of the establishment with which I am connected, and I seldom fail to make a good sawyer of any intelligent man.

SAMUEL R. SMITH,
Millwright and Engineer, with Lane & Bodley.
Cincinnati, Ohio.

Notes and Queries

C. H., of S. C.—We prefer not to publish communications in regard to the treatment of cholera, unless they have been well tested and approved by physicians. In the hands of unskilled persons injury might result. Sugar of lead is a powerful astringent but it is not considered so safe a remedy as some others.

L. B. T., of Md.—On pages 294, and 431, Vol. X.' you will find the proportions of key seats.

W. A. B., of N. C.—The number you send for is out of print but you can purchase a treatise on the art of brewing from D. Van Nostrand, of this city.

F. J. L.—of ——.—There was undoubtedly some moisture in the dish when you poured the molten zinc in. It is not a property of zinc to explode when melted. Your brother's vision was defective.

J. C. K., of Pa.—We are much obliged for your article upon cipher writing, but in view of what has already appeared on the subject, we think enough has been published.

O. S., of Va.—A gold ring that has lost color may be renewed, according to the "Practical Metal Worker," by the following process: Make a paste with 3 parts nitrate potash, 1½ alum, 1½ sulphate zinc, 1½ common salt, put this on the ring and set the latter on an iron plate over a fire until black hot, then plunge the ring into the cold water. After this it must be polished, which is easily done, with rouge or common chalk, on a woolen cloth. This gives a fine deep color.

D. S. B., of Wis.—The best recipe for hardening edge tools is to use hot fire and cold water. Fish glue is used by belt makers for joining the leather before riveting; possibly some use a different cement.

W. B. H., of Ohio.—The "Practical Draughtsman" will give you the desired information on isometrical drawing; to be had in all the large cities.

E. J. P., N. Y. City.—Wire springs, either coiled or spiral, can be expeditiously and evenly tempered by using a tub or tank of cold water, on which floats a stratum of whale or fish oil, of sufficient depth to immerse the spring before it reaches the water. If the heating is of the right temperature or color, this will be found an effectual method.

O. C., of Boston.—Your improvement can, we think, be patented.

F. S., of Ill.—We are not aware that alcohol is irregular in its rates of expansion by heat. Its expansion is always the same for equal increments of heat at ordinary temperatures. If we could freeze it, there would probably be found, as, in the case of water, an expansion by cold near the freezing point.

S., of Pa.—Melted gutta-percha makes an excellent coating for the parts of metals to be protected from the plating bath.

S., of Conn.—Vulcanized rubber which has been softened by heat, is made useful again by grinding it with raw rubber and sulphur, and subjecting the compound to heat as in the ordinary process of vulcanizing.

S. U., of Conn.—If you design to take out a patent for your invention, you had better not delay the application—provided you have completed your experiments—nothing is gained by delay and much is often hazarded.

R. W. C., of Troy.—The "Practical Draughtsman," published by H. C. Baird, 406 Chestnut street, Philadelphia, is probably the work you need for mechanical drawing.

J. S. Barre, desires to be informed if soaking shingles in lime water increases their durability. We cannot say whether it does or not, but it will make them nearly incombustible.

E. C. H., of N. Y., says his well tastes strongly of kerosene at night and morning, a freak that has lasted for only three months, although the well has been used for forty years If the well is, as stated, in limestone rock, this "freak" is not likely to be caused by the natural presence of petroleum, but is probably the result of surface drainage.

C. & Co., of Buffalo.—Sulphate of copper, commonly called blue vitriol, dissolved in water, will form a bath to copper iron castings. Immerse the articles for a short time, and then scour them in a tumbling barrel with sawdust and leather scraps.

O. C., of Mass.—It is well known that wood naptha and concentrated alkaline solutions will cut gum shellac. You could not obtain a patent for the process.

Correspondents who write letters to us for information, are always required to sign their names to their letters. We insist upon the observance of this rule as an act of good faith.

© 1866 SCIENTIFIC AMERICAN, INC.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

FRUIT BASKET.—ISAAC C. GLEASON, Middletown, Conn.—This invention consists of a polygonal fruit basket with a circular bottom, the tapering sides of which are formed of a single piece, partially cut, to form the angles of the sides, and its ends secured by eyelets, and the round bottom being held in place by its edge fitting into horizontal slits formed in the sides near their lower edge.

DISTILLING APPARATUS.—C. H. HALL, 633 Hudson Street, New York City.—This apparatus consists chiefly of a supply tank or still from which the oil or other liquid courses down in a slow current to a semicircular retort, the bottom of which it covers in a thin stratum so that its temperature can be regulated, and destructive distillation and colorization of the distillate can be avoided. While the liquid passes down over the inclined bottom it evaporates, and the vapors pass through a horizontal tube which is surrounded by a water jacket in which steam is generated, and this steam is conducted back through one branch of the tube where it is superheated and causes the light or condensible vapors of the oil to separate from the condensible gases, and to collect rapidly in a suitable receiver, where they are driven back into the supply tank or out in the open air, while the condensible vapors of the oil or other liquid also collect in the receiver, whence they are drawn off in the liquid state. A suitable scraper, which is carried over the bottom of the retort, prevents the formation of a sediment on the same, and the residuum, composed of the least volatile parts of the oil or other liquid, is carried into a tank by the suction of a jet of steam. The residuum in this tank is washed and cleaned and then returned to the supply tank to undergo a second distillation. The operation of distilling can thus be continued without interruption, and the largest possible percentage of useful material extracted from the liquid to be distilled with the least possible expenditure of fuel.

BUCKLE.—G. F. J. GUNNING, New York City.—This invention relates to a buckle made of one piece of metal wire which is bent so as to form two jaws and a shank, in such a manner that when the end of a belt or strap is secured to the shank and the other end drawn through both jaws and then back between the same, a strain exerted on the strap will cause the jaws to close up and to clasp the strap tightly, and if the strain ceases, the jaws spring open by their inherent elasticity, and the belt or strap can be readily adjusted to any desired length.

ROLLER and CORN PLANTER.—W. E. RICH, New Providence, Iowa.—This invention consists in a novel manner of operating the seed-distributing device, and in the means for covering the seed, the above parts being used in connection with a roller, whereby a field, after being properly furrowed in one direction, may be planted with corn, in check rows, by the passage of the machine at right angles over the furrows.

EGG BEATER.—FREDERICK ASHLEY, New York City.—In this invention the beater for the eggs is at one end of a shaft upon which is arranged a hollow sleeve or nut, in such a manner that by sliding it up and down upon such shaft a reciprocating rotary movement will be imparted thereto, and consequently to the beater.

WRITING STAND.—DAVID I. STAGG, New York City.—This is a combination of a stand, writing desk, and book holder, whereby the device may, with the greatest facility, be adjusted so as to be used for any of the purposes above specified, and still be simple in construction and economical to construct.

WOOD-MOLDING MACHINE.—THOMAS DICKINSON, Newark, N. J.—This is a wood-molding machine for working irregular forms on circles or parts of circles, and it consists of the combination, with an ordinary wood-molding machine, of an adjustable box table, arranged with guides to bind the molding to the cutters.

PROTECTOR for HORSE'S FEET.—A. H. KNAPP, Coxsackie, N. Y.—This invention consists of a leather diaphragm supported upon a spring of the same shape as the horseshoe, and introduced within the shoe in such a manner that the diaphragm completely covers and protects the bottom and frog of the animal's foot. For winter use for preventing falling, and, indeed, for protection against gravel, stones, and all liabilities to external injury, this is an effective and admirable improvement. It may be quickly applied or released. We have seen nothing superior.

CORN SHELLER AND BEAN THRASHER.—B. P. PENDEXTER, Mechanic's Falls, Me.—This invention consists of a combination of devices so arranged that they form a strong, compact, and effective corn-shelling and bean-thrashing machine, or grain cleaner, of great practical convenience and utility.

COMBINED KNIFE AND SCISSORS SHARPENER.—M. V. B. HOWE, Ashburnham, Mass.—By this invention the sharpening of both knives and scissors can be accomplished with the utmost ease and facility; the sharpener being both extremely simple and cheap to manufacture.

CHURN.—W. H. TILLOU AND SOLOMON SHUMWAY, Le Roy, N. Y.—This invention consists in the peculiar construction of the gear wheel, and in its combination with the cog wheel attached to the upper end of the dasher handle, for imparting a reverse or reciprocating motion to the churn dasher.

CHURN AND ICE CREAM FREEZER.—THOMAS W. POMEROY, East Hampton, Mass.—This invention relates to an improved churn and ice cream freezer, and it consists in a novel arrangement of the cream receptacle and an external case, whereby cream may be churned and butter produced in the most expeditious manner possible, and superior butter obtained owing to the cream being brought to a proper degree of temperature during the operation of churning. The same device also serves as a superior ice cream freezer.

CAR COUPLING.—HIRAM HUGHES, Sanora, N. Y.—This invention consists in a pivoted latch and a suspended bar arranged within a draw head and used in connection with a link or shackle, whereby a simple and efficient self-acting or self-connecting coupling is obtained, and one which will admit of being readily disconnected when desired

RAILROAD CARS.—JOSHUA H. ZINN, Kingston, Tenn.—The object of this invention is to arrange the bottom of freight or other cars so as to rest upon the lever frames of weighing scales to allow the contents or load of the car to be weighed.

WINDOW SHADES.—HNERY READ, Ypsilanti, Mich.—This invention relates to the hanging of a window curtain or shade, whereby it can be rolled up or lowered at pleasure and with the utmost ease and facility.

BROOM HEAD.—MARTIN HANELINE, Clear Creek, Ind.—This invention consists principally in the combination of the metallic plates and toothed and wire bars with the wooden frame of the broom head.

FENCE.—S. H. MITCHELL, El Paso, Ill.—This invention consists in covering the notched ends of the seats of the panels, where they are locked together with wire, in order to preserve the ends or prevent them from splitting; and also in a novel arrangement or application of the stakes of the fence and the securing of the notched ends of the panels in position.

BROOM.—S. S. EVANS, El Paso, Ill.—The construction of this broom is exceedingly simple. The upper or butt ends of the corn are inserted in a ring, the handle is driven up through the corn and ring, and a ring clasp slipped down over the corn a little below the end of the handle, and bent so as to give the desired shape to the broom.

MEDICAL COMPOUND.—T. W. SPEISSEGGER, Charleston, S. C.—This invention consists in a compound of certain ingredients to be applied as a salve for the cure of the itch, and all cutaneous diseases, bruises, cuts, chaps, eruptions of the skin, etc. The patent was issued June 17, 1866 (last week). The inventor wishes to say that one-half of the patent right will be sold or arrangements made with some moneyed party to enter into the manufacture of the ointment.

TOPSAIL-KEEPING RIG.—WILLIAM G. SMITH AND DANIEL HOOPER, New York City.—The object of this invention is to obviate the necessity for hauling out the reef-tackles by providing a means for holding up the body of the sail when the upper yard is lowered for reefing, so that, in effect, the reef-tackles are already hauled out, as soon as the upper yard is down, and the men can go upon the yard at once, without first having to stop and expend time and labor in hauling up the reef-tackle.

BROOM HEAD.—JAMES WASSON, Fairwater, Wis.—The broom head, in this invention, is formed of two parts, the upper ends of which are soldered to the socket, for the handle, and the lower ends are secured to each other by barbed spikes or hooks, which also assist in holding the corn to its place. The lower side edges are kept from bulging by hooks that pass through the corn and hook upon the edges of the broom head.

PASSING FISH OVER DAMS.—DANIEL STECK, Hughesville, Pa.—This invention has for its object to furnish a means by which fish may be enabled to pass over dams in ascending streams. It consists in the arrangement of a series of inclined planes, with each other, with the end of the dam, and with the bank of the stream.

FAN MILL SIEVE.—E. D. NORTON, Bradford, Pa.—This invention consists of an improved screen or upper sieve, for a fan mill, formed of strips of corrugated sheet metal, the edges of which overlap each other.

HARVESTING CORN.—ABRAHAM DYSON AND W. C. MACQUEEN, St. Louis, Mo.—The object of this invention is to obtain a device which will perform the work efficiently, admit of the cutting devices being adjusted to suit the width of the spaces between the rows of plants, and also admit of the cut stalks or plants being discharged in gavels or bundles of the desired size.

ICE CREAM FREEZER.—JOHN R. CHAMPLIN, Laconia, N. H.—This invention consists in the form and arrangement of the vertical arms of the beaters, in the construction of the frame that supports the gearing, and in the manner in which the gearing is connected to the beater shaft.

BRICK PRESS.—JOSIAH S. ELLIOTT, East Boston, Mass.—This invention consists in an improved means for preventing the clogging-up of the hopper and carrier, and also in an improved manner of operating the carrier and the mold in which the bricks are compressed. Also, in a sweep for discharging the brick from the stationary bottom of the mold.

BOOK HOLDER.—DAVID I. STAGG, New York City.—The object of this invention is to obtain a simple, neat, and cheap device, which may be adjusted to suit books of different thicknesses, and to hold them open equally well with a greater or less number of leaves at either side.

SCREW WRENCH.—JOHN C. TAFT, Worcester, Mass.—In this invention, the screw is fitted in a step connected with the ferrule of the handle. The ordinary wrenches of this kind are very liable to have the ferrules of the handles forced back on the latter, under the action of the screw, in adjusting the movable jaw of the wrench to its work, and this renders the screw liable to slip out from the step, a contingency which this invention fully obviates.

HORSE RAKE.—H. A. BAILEY AND A. R. BURDECK, Racine, Wis.—The object of the invention is to obtain a horse rake which may be readily operated, and be under the complete control of the driver, and one which will be strong and durable.

SKATE.—J. L. PLIMPTON, New York City.—This invention consists in a novel and improved construction and arrangement of the several parts, whereby several advantages are obtained.

MEDICAL COMPOUND.—W. T. SALIE, Bowdoinham, Me.—This is a new and improved medical compound, especially intended for the cure of diptheria, sore throat, and canker in the mouth.

WELL BORING APPARATUS.—DAVID MORRIS.—Patent was issued June 26, 1866.—This invention consists in a novel arrangement of the horse-power for operating the drill. Also, in the form and construction of the drill and in the water pipe in connection therewith, as fully shown in the drawings and set forth in the claims.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

LAW APPLICABLE TO REISSUE OF LETTERS PATENT.

BEFORE THE EXAMINERS-IN-CHIEF ON APPEAL.

S. H. Hodges for the Board.

Application for the Reissue of a Patent for a Grain Separator.

The entire application was rejected upon the ground, in the first place, that "there appears to be no such defect or insufficiency in the original specification as to render the patent granted therein inoperative." There was but one thing claimed in the patent—the passages for the blast (through the fan tube, the vertical tube, and over the delivery board), as controlled by the valve. If the applicant is entitled to the first combination he now claims, it is manifest that his patent does not protect this right. So of other claims. It cannot, therefore, be intended by the above objection, to assert that it is not inoperative to secure to the applicant the monopoly of those claims. It must be intended—and such is the apparent purport of the language in which the objection is couched—that the patent, being operative, for certain purposes, and securing the right to a part of the invention, it is not a proper subject for a reissue. Such would seem to be a fair construction of the statute on the subject; and, were the question an open one, strong reasons might be given for adopting it. But it has been often settled in this Office, before the Circuit Court of the District, on appeal, and by the highest judicial tribunals, in trials at law, that a patent may be reissued for devices not originally claimed, although it effectually embraces others. It must, therefore, be considered the established doctrine of law, that however valid a patent may be, and however sufficiently it may secure to the patentee some of his rights, he is, notwithstanding, entitled to a reissue to secure others.

The following quotation embodies another objection: "The Office can see no force in your argument that, in deciding your case, the Examiner did not consider the feature of a 'divided blast,' inasmuch as no such feature was mentioned in any of your claims. It is the practice of the Office to act upon claims as they are presented, not as they may be afterwards modified to avoid the references given."

As the argument referred to is not in the files, it is not clear what is intended by this. The express design of the statute is to enable an applicant to avoid the references given in any case, and to modify his specification for that purpose, and the practice of the Office has always conformed to this. Hence, the passage quoted cannot be supposed to allude to the references given in answer to this application, but to those furnished in the original case. Even in that view, it cannot be sustained. It has been expressly decided, on appeal to a Circuit Court Judge, that a reissue may embrace devices expressly disclaimed in the original specification. [Haydn's case, decided Aug. 8, 1860.] Much more may it be made to embrace devices once rejected, after such a modification as shall distinguish them from those which have been adduced as anticipating them.

This consideration also disposes of the further objection, that substantially the features now claimed were relied upon in the original application, and were rejected. If the patentee were even persuaded to disclaim such devices, it would not debar him from now insisting on them. But it is added that the patentee accepted a very limited claim for eleven years, and that numerous patents have since been granted, embracing devices similar to those before us.

The objection last raised has been more than once urged without avail, against reissued patents, as for instance, against Woodworth's, for a planing machine. Neither the fact that the devices sought to be monopolized on the reissue were considered and refused in the original application, nor the fact that the patentee has acquired for many years, in a limited claim, constitute a bar. And we are not prepared to say that these two circumstances combined, amount to a sufficient objection.

It is said, further, that great inconvenience will follow from the effect of granting this reissue, upon those who have patented similar devices since the applicant first petitioned this Office. The patentees cannot be prejudiced from this cause, however. If the claims interfere with those of the applicant, they must fail, whether the reissue is granted or not, if it appears that they were anticipated by the applicant in their supposed inventions. The disastrous operation upon those who have become engaged in the manufacture of these machines, and in the use of them, cannot be doubted. But it is impossible to avoid this so long as the doctrine announced in Stimpson *vs.* The Westchester Railroad Company, 4 How. 380, and Battin *vs.* Taggart, 17 How. 74, remain unimpeached by competent authority. The evil, great as it undoubtedly is, must be submitted to for the present. [See, also, Wilson *vs.* Rousseaw, 4 How. 647, and John A. Taplin's case, 1 Com. Dec. 107.]

An elaborate comparison of the devices claimed, with those referred to as anticipating them, is omitted.

Washington, D. C., Oct. 20, 1862.

NEW PUBLICATIONS.

PETROLEUM: A HISTORY OF THE OIL REGION OF VENANGO COUNTY, Pa.—By Rev. S. J. M. Eaton. Published by J. P. Skelly & Co., 732 Chestnut street, Philadelphia.

From the publishers we have received a duodecimo volume with the above title, and have examined its contents with much gratification. From personal observation we can testify to the correctness of the descriptions and the fidelity of the illustrations. Next to visiting the oil regions a perusal of this volume will give an excellent idea of that wonderful locality. In some respects the information given in this work is more reliable and satisfactory than that gained by personal inspection The book is not intended as a scientific treatise, but for the gratification of a laudable curiosity. It is profusely illustrated, and contains an excellent map of the oil region of Western Pennsylvania.

CHICKENS.—Prang & Co., Boston, Mass.

Messrs. Prang & Co. have published a beautiful chrome lithograph of one of Tait's pictures, consisting of a group of five chickens. It is an excellent specimen of the art, and few would be able to detect that it was not a genuine oil painting.

SPECIAL NOTICES.

Henry C. Smith, of Cleveland, Ohio, has petitioned for the extension of a patent granted to him on the 28th day of September, 1852, for an improvement in Lath Machine. The Petition will be heard on the 10th day of September next.

Samuel Hurlbert, of Ogdensburgh, N. Y., has petitioned for the extension of a patent granted to him on the 20th day of September, 1853, and ante-dated September 20, 1852, for an improvement in Plows. The petition will be heard on the 3d day of September next.

William Moore, of Brooklyn, N. Y., has petitioned for the extension of a patent granted to James Carman, assignee of the said William Moore, on the 14th day of September, 1852, for an improvement in Door Locks. The petition will be heard on Monday, the 27th day of August next.

Wanton Rouse, of Taunton, Mass., has applied for an extension of his patent on Self-acting Mules. The petition is to be heard on the 15th of October next.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentees and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

© 1866 SCIENTIFIC AMERICAN, INC.

Bushing, Adjusting and Lubricating Millstones.

It entails often a large loss of time and expenditure of labor to raise the running stone of a mill for the purpose of lubricating the spindle. The difficulty, also, of properly adjusting the runner on the bed stone, so that the contact may be even, is a serious one. It is the object of this invention to obviate those difficulties.

The accompanying illustrations, with the explanation, will convey an accurate idea of the improvement. Fig. 1 is a vertical section of the lower stone, with the bushing supported on a convex circular plate. Fig. 2 is a plan or top view of the bushing, the convex plate, and an outer plate designed to support the stone.

At A is a bushing or box, inserted in the eye of the stone and bolted to the plate, B. At C is a hole through the plate designed to admit the hand into the eye of the stone, which is larger where the bushing is than above. The upper outer edge of the bushing is sharp, being beveled toward the spindle, forming a cup-shaped receptacle. This is to facilitate the lubrication of the spindle with tallow or other similar substances.

D, Fig. 2, is a circular plate bolted to the frame, E, sustaining the stone. The plate, F, same figure, is secured to the bottom of the stone, and is curved or concave to fit on the surface of B, and thus allow of an automatic adjustment of the bed stone to the face of the runner; the slots, G, receive pins secured in B, so that a slight lateral motion is allowed, sufficient to insure a perfect adjustment of the two stones at all times.

It will be seen that by this device the lubricating of the spindle can be effected without raising the runner or upper stone, which consumes considerable time and labor, and that the even working of the stones is always secured by the adjustment of the bed stone to the runner.

Patented through the Scientific American Patent Agency, Oct. 24, 1865. Application on other improvements pending. For particulars address the patentee, Charles T. Weston, Scranton, Pa.

Fig. 1

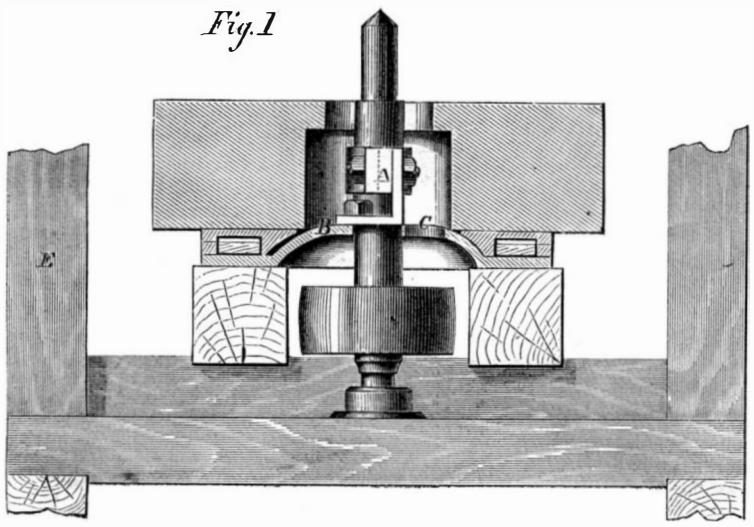
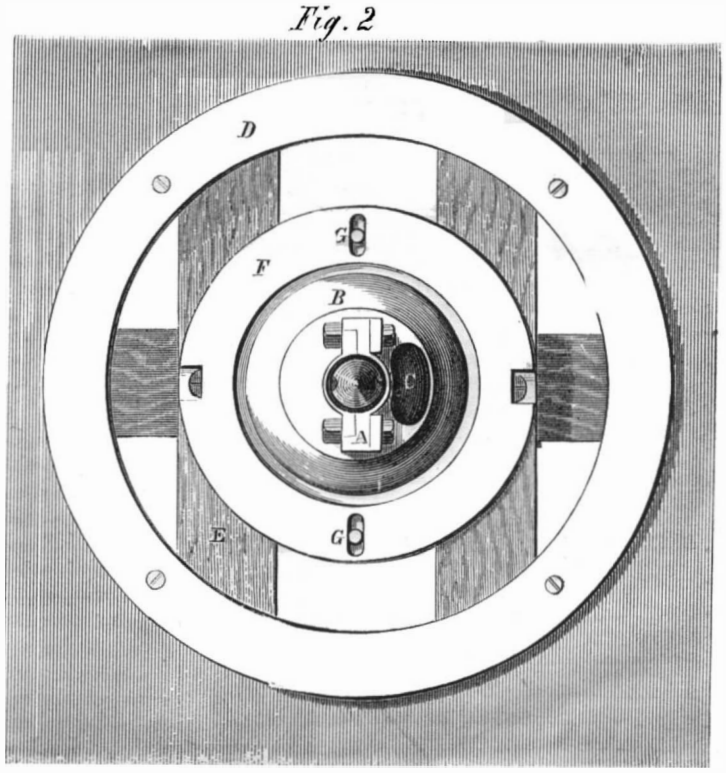


Fig. 2



WESTON'S IMPROVEMENT IN MILLSTONES.

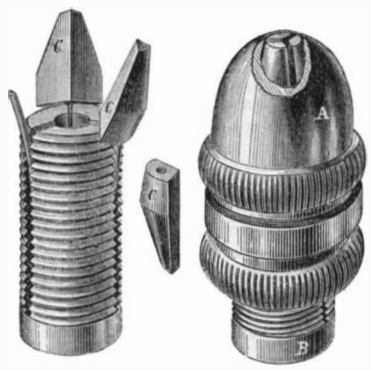
Water as Fuel.

Few persons are aware of the large percentage of actual moisture that abounds in most fuels. The careful housewife, desirous to economize her fire, "backs" it up with wet cinders. The poor employ wet tan. And there are not many who have not watched the nailer with curious interest, when, after a good sprinkle with his handbroom, previously dipped in water, he had made his smithy fire glow again with a very few blasts of his bellows. The Rev. M. Mouie, of Dorchester, has had constructed a cooking stove, in which the combustion, to a certain extent, of water is the principal feature. In the trials made a few years since for ascertaining the economy of burning wet fuel, the results obtained were perfectly marvelous. Fuel containing actually 70 per cent of moisture was burnt in an arched brick stove or furnace. The heat produced was sufficiently intense, the thick wrought-iron door having been previously closed, to raise to whiteness the arch of the oven. The fire, indeed, in the first instance, was lighted with dry fuel, but afterwards the wet fuel was exclusively resorted to. Surely, here are indications of no little importance, at a time when the exhaustion of our coal fields is under consideration.—*Mining Journal.*

[It is hard to argue against facts, and we have had repeated assertions through the press and by individuals, of the great apparent gain by the use of wet fuel, but common sense would say that the heat required to drive off or decompose the gases of water would be equal to that obtained from their subsequent combustion. Dr. Hagan's water-burning stove has been in use for some time, but whether it anticipates that of Dr. Mouie is a question.

OLMSTED'S PATENT DRILL CHUCK.

We well remember the time when the "live" spindle of a lathe was provided with a tapering square hole to which the shank of the centers and each drill used was fitted. Then came the round hole, and then the drill chuck, holding the shank of the drill by a set screw or by a flatted portion fitting in a transverse slot through the chuck. The idea of a



proper drill chuck, adapted to all sizes of drills and demanding only perfectly round chucks, is quite modern. Yet these chucks are considered now an absolute necessity in every well ordered shop.

The chuck hereby illustrated seems to be a very convenient form, easily adjusted and holding the drill securely. It is also well adapted for holding wire to be threaded. Every piece of which it is composed is of cast steel well hardened. It can be furnished with a shank to fit the hole for the center, screwed on the spindle, or slipped on the center. No wrench is necessary, the gripe of the fingers being sufficient to secure the shank of any drill. The inventor claims that he has used a one-inch drill, in tenacious wrought iron in one of them, receiving a shank of only three-eights of an inch diameter without using a wrench.

A represents the shell of the chuck with milled bosses for the fingers. The core, B, is threaded and fits on the lathe spindle or center. The front of the shell is bored to receive the jaws, C, whose outer surfaces correspond with the incline of the inside of the shell, so that in screwing up the shell, the friction of the thread acts with the compression of the two inclines of the jaws and the conformation of the interior of the shell. The core, B, is slotted to receive a steel wire spring which is inserted into the rear of each jaw, so that when relieved from pressure, the jaws open automatically.

With this brief explanation, the operation of the chuck can be easily comprehended. These chucks are made of two sizes, one with an opening of three-eights of an inch, and the other of three-sixteenths of an inch, and they can be made of larger sizes. Patented May 15, 1866. For more particular information address L. H. Olmsted, Stamford, Conn. [See advertisement in another column.]

Water-proof Enamel for Card Photographs.

The following process for enameling cards is a very good substitute for the collodion transfer process, and is much easier of application. First apply to the surface of the card, with a brush, a solution of gum arabic in water, of sufficient strength to give considerable gloss when dry. As soon as dry, apply a coating of plain collodion in the same manner as coating a plate. If the collodion is not very tough, two or three coatings may be applied to advantage. Finish by passing the card through a roller, and you will have a fine gloss. Care must be taken not to have the gum solution too thick, or the surface will crack when dry, though there is but little danger if the collodion is applied soon after the gum is dry. Gelatin, instead of gum arabic, answers the purpose well, though it gives hardly as much gloss. Perhaps you or your readers may have a better process than this. If so let us have it.—*Philadelphia Photographer.*

VARNISH FOR PHOTOGRAPHS.—M. Bussi first brushes the prints over with a solution of gum arabic, and when this is dry, applies a coating of collodion. The following are the proportions recommended:—

1.—Clear transparent gum arabic, 25 grammes; distilled water, 100 cub. cents.; dissolve and strain.

2.—Gun cotton, 3 grammes; alcohol, 60 grammes; ether, 50 grammes.

By this double varnish the inventor insures the preservation of the proofs.—*Chemical News.*

THE engines and boilers for the new steam frigate *Ammonoosuc,* are constructing at the Morgan Iron Works, in New York, at a cost of $700,000, and are of the most powerful description.

© 1866 SCIENTIFIC AMERICAN, INC.

THE

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT

NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

VOL. XV., No. 2, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, JULY 7, 1866.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improved Steam Boiler	15	Law Applicable to Reissue of Letters Patent	21
Locomotive Boilers	15	New Publications	21
Why a Gun Becomes Hot on Firing	16	Special Notices	21
Foreign Scientific News	16	*Bushing, Adjusting, and Lubricating Mill Stones	22
An Extraordinary Railroad Disaster	16	Water as Fuel	22
Ryerson's Churn	16	*Olmsted's Patent Drill Chuck	22
The Spectroscope	17	Water-Proof Enamel for Card Photographs	22
A Great Railway Enterprise	18	Educated Mechanics	23
Variable Star	18	Free-and-Easy Legislation on Patents	23
*McDonough's Caloric Engine	19	A Four-Tool Planer	23
To Prevent Chafing	19	Just Measure	23
*Christian's Device for Oil Wells	19	Patent Claims....24, 25, 26, 27,	28
Glass Brick Mold	19	Advertisements....28,	29
Our New Dress	19	*Improved Gage Cock	30
A Weak Steam Boiler	20	*Improved Journal Box	38
Circular Saws	20	The "Galaxy"	30
Notes and Queries	20	University Law School	30
New Inventions	21		

EDUCATED MECHANICS.

In a recent number we spoke of the advantages of intellectual education for mechanics and workingmen, in addition to that derived from the shop, the farm, or the road. We alluded to it as a means to raise the position of the workingman and to elevate the *status* of his profession.

In the ordinary prosecution of his business, the artisan must be stolid indeed if he did not gain some knowledge beyond that of mere manual dexterity. His judgment and his capacity for comparison is stimulated by hints, incidents, and accidents, so that he must improve more or less. But an acquaintance with the laws which govern matter in all its forms, whether at rest or in motion, the means of availing himself of the operation of those laws, come slowly to him unless he understands the principles upon which those laws are founded. Such knowledge is not readily gained in the prosecution of his business, but by study. Knowing the existence of the phenomena, of which he is a daily witness, he must spend years in using that knowledge by piecemeal as he receives it, and work over again the experiments, the processes and results of which have been recorded for him, unless by reading and study he is willing to avail himself of the labors of those who have gone before him.

Therefore we cannot too strongly insist on the study of the natural sciences by all who aspire to use the latent or active forces of nature for the benefit of themselves or of mankind in general. An instance of the benefit to be derived by mechanics by a judicious course of study, we cannot forbear to introduce here, an instance of the recognition of merit—in the hope that others may be induced to follow so shining an example. We have mentioned the fact that at the annual commencement of the University of the City of New York, held June 21st, at Niblo's Garden, the degree of Doctor of Physical Science (*Doctor Physicis Artibus, A. P. D.*), was conferred upon Erastus W. Smith, an eminent mechanical engineer. It was the first honorary degree of this character conferred in this country.

We have obtained some facts in regard to the recipient of this honor which may not prove uninteresting. Mr. Smith served an apprenticeship at the Allaire Works, in this city, remaining there four years, when he entered the University and pursued a course of study in the physical sciences, graduating with the class of 1844. He returned to the Allaire Works and spent several years as workman, foreman, and superintendent. He has since filled important positions as engineer of the American U. S. Mail Steamships, comprising the Bremen, the Southampton, the Havre, and the Collins's Liverpool lines.

He designed and superintended the construction of the engines for the New Orleans Water Works, and of the engines of several inland lines of steamers, including the *Metropolis*, of the Newport route, and is now designing and constructing engineer of the Harlem Bridge, the engines of the New York and Bristol line of steamers—the cylinders of which measure 110 inches with twelve feet stroke,—of several other steam-transportation companies, and of the *Dunderberg*, under the Government contractor, Wm. H. Webb.

Application to and love for his business, with a determination to fit himself for the highest positions in his profession, we believe, have been of more service to Mr. Smith than the patronage of influential men or capitalists. In his letter conveying the information of the honorary testimonial, Prof. Draper said:—

"I am sure it will be gratifying to you to learn that yours is the first degree of the kind ever conferred in this country, and is the highest we can give. It is for these reasons all the more honorable to you. The establishment of this degree places the University in connection with mechanical engineering—one of the most important and growing professional interests of our city and country."

Our object in thus noticing this acknowledgment of merit is not to add to the well-earned reputation of the recipient of these honors, but to present it as an incentive to our mechanics. When literary societies and educational institutions accord to the educated mechanic and the scientific engineer the position to which his usefulness and worth entitles him, the *status* of the mechanic is raised and his profession becomes, in the eyes of the world, more honorable. Practical knowledge, combined with natural genius, aided by mental acquirements, is sufficient to enable any intelligent mechanic to reach the uppermost round in the ladder of his profession.

FREE AND EASY LEGISLATION ON PATENTS.

On the 25th ult., Senator Cowan, chairman of the Patent Committee, reported a bill for the extension of Thos. D. Burrall's patent for a corn sheller; he also reported a bill for the extension of Thos. W. Harvey's patent for the manufacture of wood screws; also for the extension of Stephen R. Parkhurst's patent for ginning cotton and burring wool. It remains to be seen what action the Senate will finally take in regard to those important measures.

Mr. Cowan reported the House bill, which provides for the payment of a ten-dollar tax on all cases taken from the primary Examiner, on appeal, to the Examiner-in-Chief. After the Senator had stated the nature of the bill, the following debate took place:—

Mr. Cowan.—I will merely state that an application for a patent is first referred to the primary Examiner, and if the decision is adverse there is an appeal to the Board of Examiners, but on that appeal there is no fee now paid. It is complained in the Office that parties do not appear before the primary Examiners, because they can appeal without any additional cost; and it is therefore thought to be advisable, for the purpose of compelling them to attend to the case before the primary Examiners, that there should be an appeal fee, to be paid before going to the Examiners-in-Chief. The committee think this is proper, and have therefore recommended the passage of the bill.

Mr. Grimes.—Is that all there is in the bill?

Mr. Cowan.—That is all.

The bill was reported to the Seuate, ordered to a third reading, read the third time, and passed.

Thus a bill which will draw from the pockets of inventors between $4,000 and $5,000, annually, passed without a show of opposition. Mr. Cowan's, "That is all," satisfied the Senate, and the thing was done.

We regret the success of this unjust measure. The Patent Office has nearly $150,000 surplus funds, and does not need to tax inventors any more for the privileges they now enjoy.

A FOUR-TOOL PLANER.

Some few weeks ago we gave a description of a seven-tool lathe for working out railway cranks with accuracy and dispatch, which was in use at the locomotive works of Crewe, England. We find, in a recent number of the *Engineer*, an engraving and brief description of a planer designed to economize time, it being well known to practical men that half the time of an ordinary tool of this class is wasted; or, in other words, that during the return of the bed the tool is idle.

Planers that act both ways are not new, by any means, Whitworth having, long ago, introduced a machine of this class with a rotating tool post that faces about after the bed has made one stroke, and cuts on the return. What degree of popularity this device meets with in England, we are unable to say, but few machines have been imported to this country. On long lathe beds, steam engine bed plates, and similar work, such an arrangement would seem to be very desirable, but there must be some practical difficulties in the way which prevent their adoption.

We have been informed that it is a matter of difficulty to adjust the tool so that the cut is equal in running both ways, and that the least hesitation or inaccuracy in the reverse action of the tool causes it to take a heavier cut at one time than at another, and so, break the tool or spoil the work.

In Elder's machine there are two sets of standards or uprights in the middle of the bed, which face each other, and are fitted with sliding carriages and headstocks, as usual, there being two headstocks on each slide. These are so arranged that but one or all may be in use at the same time; that is, two cutting when the bed runs one way and two when it returns.

This duplication of parts, of course, entails great expense in construction and adds to the weight of the machine, besides rendering it much more complicated; but there is no question about its efficiency, which is the main point to consider.

A JUST MEASURE.

In a previous number we stated that the bill to pay Examiners in the Patent Office, for extra service rendered by them, had passed Congress. A dispatch to the Associated Press made it appear that the money thus appropriated was to come from the Treasury, which is not the case. The facts are simply these: Soon after the breaking out of the rebellion the number of applications for patents was greatly reduced, which caused also a considerable reduction in the patent fund, and in order to comply with the law making the Patent Office a self-sustaining bureau, the Commissioner was obliged to reduce the salaries of Examiners and Assistant Examiners below the amounts fixed by law, which was the best course he could adopt as a temporary expedient, as it could not be regarded wise to remove experienced Examiners in such a contingency, which was not likely to last for a long time. During the years from 1852 to 1860, the average number of cases examined per man was one hundred and forty-two; from 1860 to 1865 the average was two hundred and forty—an increase of eighty-two per cent. This increased amount of labor was done on reduced salaries and at a time when the cost of living was double what it was before the war broke out. The Examiners, as a body, are a faithful, laborious, intelligent set of men, and, at best, are not overpaid for their services, and now that the patent fund has so largely augmented, there is great justice in the act of Congress which authorizes the Commissioner to pay Examiners and Assistants out of the patent fund for services actually performed by them.

Mr. Wentworth, of Illinois, attempted to defeat the bill, but his effort did not produce any effect. Mr. Jenckes, the mover of the bill, and to whom much credit is due, met all the objections, and the bill passed by a large majority.

THE 9·22-inch bore or 12½-tun Armstrong gun burst to splinters a few days since at Shoeburyness during ordinary gun practice, and after 390 rounds had been fired. The gun's crew had a very narrow escape for their lives, and Capt. Reeves, who was conducting the practice, was nearly struck by a large piece of the gun as it flew past him.—*Mechanics' Magazine.*

ALUMINIUM ARMOR.—A trial has just been made at Florence of a cuirass of aluminium, which is as light as an ordinary waistcoat, nearly as flexible, and capable of turning a musket ball fired at the distance of 38 paces, and of resisting a bayonet thrust from the heaviest hand. Each cuirass costs only 5 frs. Two regiments are, it is said, to be immediately provided with them.

© 1866 SCIENTIFIC AMERICAN, INC.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JUNE 24, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

55,799.—MODE OF CUTTING BOOTS.—John Adams, Kokomo, Ind.:

I claim as a new article of manufacture, a boot produced as follows, to wit, by cutting the foot and leg portion out of a single piece of leather, the counter or heel piece being left out, and then constructing the uppers of the boot from said foot and leg portion and a separate counter-piece, by having a seam extend down the back to the tops of the counter, then running the seam to the front edges of the counter and from thence down to the shank of the boot, said horizontal and vertical side seams serving to fasten the separate outside counter-piece of leather over the opening which was left in cutting the foot and leg of the boot, all substantially as and for the purpose described.

55,800.—GRAIN SEPARATOR AND CLEANER.—William M. Arnall, Sperryville, Va., assignor to himself and W. H. Brownell, New York City:

I claim, 1st, The arrangement of the cylinder, E, the rollers, F, F, F, in the arc of a circle described by a radius from cylinder, E, together with the adjustable brushes, a, a, a, a, and dividing board, P, substantially as and for the purpose herein set forth.

2d, The throat, G, with its gauge-board, f, rollers, F, cylinder, E, and fan, D, arranged and used as and for the purpose specified.

55,801.—DEVICE TO PREVENT BOILER EXPLOSIONS.—Alfred Arnold, Tenaply, N. J.:

I claim, 1st, The mode of preventing steam boiler explosions, substantially as herein set forth.

2d, The construction and arrangement of the devices necessary to carry the mode into operation, substantially as described.

55,802.—EGG-BEATER.—Frederick Ashley, New York City:

I claim the grooved or screw threaded slide or sleeve, E, in combination with the plain shaft, A, having a fixed stud or pin, a, and a beater, B, arranged together and operating as and for the purpose specified.

55,803.—WATER WHEEL.—Samuel W. Ayres, Monticello, Ind.:

In combination with the spiral scroll, A, I claim the double wheel, B, C, when so arranged that the water shall be discharged from the scroll through the upper section, towards the center, and thence passing into the lower section be discharged from the center through the periphery, substantially in the manner set forth.

55,804.—HORSE RAKE.—H. A. Bailey and A. R. Burdick, Racine, Wis.:

We claim, 1st, The metal heads, J, provided with lips, g, and grooves, i, and retained on the rake-head by the upper ends of the rake teeth, K, passing through them and the rake-head, substantially as and for the purpose herein set forth.

2d, The attaching of the rake-head, H, to clutches, D, D, fitted loosely on the axle, A, and operated by means of levers by the driver from his seat, G, for the purpose of automatically raising the rake to discharge its load, substantially as shown and described.

55,805.—ROOF OF BUILDINGS.—William W. Beach, New York City:

I claim, 1st, The use of mica or mineral isinglass in sheets or plates as a roofing material, transparent, translucent, opaque, and ornamental, substantially in the manner and for the purpose herein set forth.

2d, Ornamenting upon or between the plates or thicknesses of the mica, substantially as set forth and described.

3d, Making an elastic roofing by cementing the plates of mica with flexible cement, substantially as set forth herein.

4th, The combination of mica with wood, slate, or other equivalent substances, substantially in the manner and for the purposes herein set forth.

55,806.—LAMP.—Jacob H. Beidler, Lincoln, Ill.:

I claim, 1st, The method herein described of creating an ascending current of air to feed the flame, by means of steam generated by the calorie emanating from the illuminating flame of the lamp.

2d, The combination of the boiler or heater, D, the steam pipes, D′, D′, the annular chamber, C, and the feed-tube, B, with the oil cup, A, perforated plate, g, and deflector, f, as and for the purpose described.

3d, The hot water tank, C′, in combination with the feed-tube, B, and the boiler or heater, D, as and for the purposes described.

55,807.—GRATER AND EGG-BEATER.—William A. Bemis, Spencer, Mass.:

I claim, 1st, The combination with the lower half, B, of the body of the beater, of the removable frame, D, provided with the cutting wires, a, substantially as and for the purposes set forth.

2d, In combination with the egg-beater, I claim the grater moving in guides on the body of the egg-beater, the whole being constructed and arranged substantially as and for the purpose shown and described.

55,808.—MACHINE FOR FRAMING MATCHES.—Jacob Bentz, Brooklyn, N. Y.:

I claim, 1st, In combination with the grooved bed and hopper, the loose hopper-box or frame, constructed and operating substantially as described.

2d, The construction of the grooved bed in two parts; the front part being hinged to the rear fixed part for the purpose of being swung down below the plane of the fixed part when required to remove broken splints, slivers, or other obstructions, substantially as described.

3d, In combination with the grooved bed, I claim the guides or slots in front of the grooved bed, substantially as described.

4th, In combination with the plunger frame and the front sliding frame which supports the splint frame, I claim the rock-shaft and system of paws and levers, whereby the down-feed motion of the sliding frame is communicated thereto by the back motion of the plunger frame.

55,809.—STUMP EXTRACTOR.—John W. Blodgett, Plymouth, Ind.:

I claim, 1st, The combination and arrangement of the posts, C, and foot-boards, E and N, substantially as and for the purposes set forth.

2d, Wheels, M and P, frame, L, windlass, W, chain, L, and lever, K, in combination with wheels, A, foot-boards, C, E, N, substantially as and for the purposes set forth.

55,810.—UTILIZING STEAM.—John M. Brosius, Liberty, Va.:

I claim the arrangement, with a stationary depot or water station engine, of the locomotive boiler, substantially in the manner and for the purpose described.

55,811.—COTTON-SEED PLANTER.—Frederick H. Brown, Chicago, Ill.:

I claim, 1st, In a cotton-seed planter the combination of the shaft, R, provided with arms, V, and the conveying belt, L, provided with teeth as described, arranged, and operating substantially in the manner and for the purposes herein specified.

2d, In combination with the said conveying belt, L, I claim the shaft, U, provided with suitable wings or cleaners, arranged and operating substantially as specified and shown and for the purposes set forth.

3d, The combination of the shaft, R, provided with arrows or spikes, the toothed belt, L, and the winged shaft, U, arranged and operating as and for the purposes described.

55,812.—MODE OF CONSTRUCTING VACUUM VESSELS FOR EVAPORATING, ETC.—Duncan Bruce, Rossville, N. Y.:

I claim the method, substantially as herein described, of strengthening and rendering wooden vessels air-tight, for the purposes set forth.

55,813.—HAMMER FOR BENDING COUPLINGS.—John T. Bruen, New York City:

I claim, 1st, The anvil, the hammer, the connecting-rod, and the treadle, when constructed and arranged substantially as and for the purpose herein specified.

2d, The apparatus for throwing out the material after the successive operations of the hammer, applied, arranged, and operating substantially as herein specified.

3d, The annular spring or buffer, d″, applied at the lower end of the connecting-rod, substantially as described, and serving the two purposes of regulating the stroke of the hammer and of preventing destructive concussion and noise.

55,814.—LOCK.—Henry and Samuel W. Budd, Philadelphia, Pa.:

I claim, 1st, The bolt, B, and its spring, d, in combination with the sliding block, F, and plate, b, or its equivalent, the whole being constructed and operating substantially as and for the purpose described.

2d, A series of tumblers in combination with the block, F, and with projections in the casing, D, the whole being constructed and operating substantially as and for the purpose specified.

55,815.—BRUSH FOR BOILER FLUES.—Charles H. Bush, Fall River, Mass.:

I claim an expanding and contracting brush for clearing obstructions from the flues of steam boilers, constructed and operating as herein set forth and described.

55,816.—RAILROAD WATER-ELEVATOR.—William H. Butler, Chicago, Ill.

I claim, 1st, A metal tank lined with wood which has been previously saturated with oil or other resistant to rapid condensation of steam, or coated with such resistant on one or both sides, substantially as described and for the purpose mentioned.

I also claim in combination with the follower and steam pipe the rubber packing, I, as described.

55,817.—STEP-LADDER.—E. P. H. Capron, Springfield, Ohio:

I claim, 1st, The ladders, A and B, platform, C, and the notched bar, E, all combined and arranged to operate as shown and described.

2d, The slotted bar, D, provided with the series of holes and pin, i, arranged to operate in combination with the ladders, A and B, and platform, C, as herein set forth.

55,818.—TREATING ORES.—Charles F. Carpenter, Louisville, Ky.:

I claim the mode of using steam of any temperature for the purpose of facilitating the process for extracting gold and silver from ores, and consists in introducing said steam into a reverberatory furnace between the flame of said furnace and the ores containing gold or silver which are spread upon the hearth of said furnace, as herein described, or any other substantially the same.

55,819.—WATER-INDICATOR FOR STEAM GENERATORS.—Franklin Chalfant, Lancaster, Pa.:

I claim, 1st, The vibrating column or cylinder, F, in connection with a steam boiler, A, when employed for the purpose specified.

I also claim the soapstone disks, K, when applied substantially in the manner and for the purpose set forth.

55,820.—ICE-CREAM FREEZER.—John R. Champlin, Laconia, N. H.:

I claim, 1st, The side-scrapers, G, when made in the form and adjusted in the manner described, in combination with the horizontal arms, E, of the beater, substantially as and for the purpose set forth.

2d, The frame, K, and support, X, when constructed substantially as described, in combination with each other and with the shafts, T and L, as and for the purpose set forth.

3d, The use of a combined joint and swivel for coupling the gearing to the beater and cream-holder of an ice-cream freezer, substantially as described.

4th, The coupling device herein described, in which the coupling is accomplished by dropping the clutch upon the shaft and cream-holder, substantially as described and for the purpose set forth.

55,821.—PUMP.—Robert Cochran, Morrison, Ill.:

I claim the combination and arrangement of the valve, I, pipes, O and P, and cylinders, A and B, substantially as herein described and set forth.

55,822.—PUMP FOR DEEP WELLS.—Robert Cornelius, Philadelphia, Pa.:

I claim the combination of an outer case with apertures, an interior wire gauze or perforated screen, and a receptacle below for the debris, substantially as described.

55,823.—DOOR-BELL AND BURGLAR-ALARM.—Elliot H. Crane, Burr Oak, Mich.:

I claim, 1st, So arranging two hammers to a bell that, while the bell answers the purpose of an ordinary door-bell, its parts can be adjusted to act as a burglar-alarm when the door is opened, substantially as described.

2d, The combination of the two hammers, L and O, bell, D, notched base-plate, c, swinging pawl or arm, T, and knob handle with a plate or tripper, H, upon its spindle, when the several parts are arranged together and so as to operate substantially in the manner and for the purposes described.

55,824.—HORSE HAY-FORK.—Thomas C. Craven, Albany, N. Y.:

I claim, 1st, applying a hook or barb, h, to the hollow point of a harpoon hay-fork, so that this hook shall work loosely within said point, and projected therefrom by the depression of a rod, C, substantially as described.

2d, Connecting the upper portion of the curved rod, C, to the upper portion of its hollow staff, A, by means of toggle-joints, which are adapted to serve as a locking device, substantially as described.

3d, The combination of the tripping lever or eccentric, f, or its equivalent, with locking toggle-levers and rod, C, for the purpose of unlocking said rods.

4th, Curving the upper portion of the rod, C, for the purpose substantially as described.

55,825.—CHURN.—F. J. Crissey, Leesburg, Va.:

I claim the arrangement and combination of the center dasher with fly-wheel at top and propelling cord on the shaft, so that the shaft is operated swiftly with a forward and reverse action, as herein described and for the purposes set forth.

55,826.—CULTIVATOR.—John Custer, Sandusky, Ohio:

I claim, 1st, The hinged cleaners, H, in combination with the levers, I, arranged to operate with the cutting rollers, D, in the manner and for the purpose herein specified.

2d, The combination of the cutting rollers, D, hinged cleaners, H, frame, A, bar, K, and chain, J, arranged and operating as described.

55,827.—MARINE COMPASS.—Samuel Custer, Salem, Va.:

I claim, 1st, The combination of the lower battery magnet with the upper indicator magnet, substantially as and for the purpose described.

2d, The construction of the cruciform indicator-magnet with a pointer placed midway between the north and south poles of its two needles.

3d, The arrangement of the indicator-magnet upon and eccentric with the main compass-card or its frame, for securing a longer radius to the pointer.

55,828.—ROLLER-FEED FOR CARDING AND PICKING MACHINES.—James Dempster, Naugatuck, Conn.:

I claim as an improvement in roller-feed for cards and pickers the combination and arrangement of the rolls, B, C, D, E, F, G, and the gear-wheels, I, L, M, N, S, R, and the gear-wheels, J, K, O, P, T, U, with each other and with the frame, A, of the machine, substantially as described and for the purposes set forth.

55,829.—HAY-RACK FOR WAGONS.—Daniel Dennett, Buxton, Me.:

I claim the stretchers, b, b, b, b, cut in two at d, d, in the manner and for the purposes specified.

55,830.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the combination of the two-tank car with the one-tank car, being the three tanks, B, B, B, attached to and combined with the car-platform, A, A, A, by means of the frames, C, C, C, C, C, C, C, and C′, C′, C′, C′, C′, and the bolts, D, D, D, D, D, D, D, and D′, D′, D′, D′, when constructed in the combination herein-before described, and for the application to the purposes herein-before written, or when done by any other mechanical construction substantially the same and which will produce the same results.

55,831.—CAR FOR TRANSPORTING PETROLEUM.—J. Densmore, Meadville, Pa., and G. W. N. Yost, Corry, Pa.:

We claim the one tank, B, attached to and combined with the platform of a car, A, by means of the frame of cars, C, C, C, C, and the bolts, D, D, D, D, over and upon the middle of the platform and car, when constructed and combined for the purposes herein-before described and set forth, or when attached and combined by any other mechanical construction substantially the same and which will produce the same results.

55,832.—CAR FOR TRANSPORTING PETROLEUM.—James Densmore, Meadville, Pa., and Amos Densmore and G. W. N. Yost, Corry, Pa.:

We claim, 1st, The one tank, B, square or oblong square of wood planks, bolted together and attached to an ordinary railway car, A, by means of the cleats, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

2d, The two tanks, B, B, square or oblong square, directly over the trucks or abutting together in the middle of the car, of wood planks bolted together and attached to the car, A, by means of the cleats, E, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

3d, The three tanks, B, B, B, square or oblong-square, of wood planks, bolted together and attached to the car, A, by means of the cleats, E, E, E, E, and the bolts, D, D, D, D, when the same are constructed and combined as herein-before described and for the purposes set forth.

4th, The square or oblique-square tank or tanks of wood planks, attached to an ordinary car, when constructed and combined by any other mechanical contrivance, substantially the same, and which will produce the same results.

55,833.—MACHINE FOR PLANING MOLDINGS.—Thomas Dickinson, Newark, N. J.:

I claim the arrangement described and represented for dressing two moldings simultaneously by one cutter-head, consisting of the adjustable box-table, W, X, constructed and operated substantially as described.

55,834.—APPARATUS FOR MAKING PAPER-PULP, FOR BLEACHING AND FOR OTHER PURPOSES.—John W. Dixon, Philadelphia, Pa.:

I claim, 1st, The combination of the digester, A, the man-hole, B, the diaphragm, C, and the discharge-pipe and aperture, N.

2d, The combination of the digester, A, the heating coil, and the pump, D, as described.

55,835.—APPARATUS FOR MAKING PAPER-PULP FROM WOOD, STRAW, AND OTHER MATERIALS.—John W. Dixon, Philadelphia, Pa.:

I claim the combination of the circulating pump, the pulp digester and heating coil, or its equivalent, for heating the liquid while being made to circulate by the pump.

55,836.—PROCESS OF MAKING PAPER-PULP FROM WOOD, STRAW, AND OTHER MATERIALS.—John W. Dixon, Philadelphia, Pa.:

I claim, 1st, The pulping of wood, straw, and other vegetable substances, with a solution of highly-heated aluminate of soda under pressure, substantially as described.

2d, I claim the pulping of wood, straw, and other vegetable substances by circulating a highly-heated solution of aluminate of soda through the mass to be pulped, substantially as described.

55,837.—HARVESTER.—John A. Dodge, Auburn, N. Y.:

I claim, 1st, The combination of the cam, B′, bed-piece, B, and frame, A, resting upon the platform, the said several parts being respectively constructed and arranged for use, substantially in the manner and for the purpose set forth.

2d, The plate, E, and ratchet, E′, upon the outside of the driving-wheel and pulley, D, upon the projecting extension of the axle, in combination with the belt, M, pulley, C, and bevel gearing, for actuating the rake with the forward motion of the machine, substantially as set forth.

3d, The device for supporting the arm, H, by means of the bracket, L′, attached to the socket, I, secured to the frame, substantially as set forth.

4th, The arrangement as herein set forth for supporting adjustably the inner end of the cutter-bar and platform by means of the arm, G, attached to the platform and connecting chain and projecting arm, H, secured to the main frame by the bracket, I′, and socket, I.

© 1866 SCIENTIFIC AMERICAN, INC.

55,838.—POCKET-BOOK PROTECTOR.—Alonzo Drummond, Newark, N. J.:

I claim, 1st, The combination of the spring, B, or springs, B, B, with the lever, D, and piece, C, camping, c′, c′, in the manner and for the purposes set forth.

2d, The plate, I, with its buttons or studs, K, in combination with the springs, B, B, when constructed in the manner and for the purpose described.

3d, The lever, D, the clasp or hinge, E, slot, e, and knob, d″, constructed and operating substantially as set forth.

4th, The spur, F, dog, G, slide, f″, lever, D, and knob, g″, in combination for operating the spur, substantially as set forth.

55,839.—LANTERN.—A. M. Duburn, Chicago, Ill.:

I claim, 1st, The part, H′, secured by the hinge, K, when constructed as described, and used for the purpose set forth.

2d, The recess, m, m′, m, for the purpose set forth.

55,840.—CORN HARVESTER.—Abraham Dyson and William N. Macqueen, St. Louis, Mo.:

I claim, 1st, The rotary cutters, C′, arranged at the front end of the machine, with the plates, U, gearing, and the racks and pinion, substantially as shown and described, to admit of the lateral adjustment of the cutters to suit the width of the spaces between the rows of stalks or plants, as set forth.

2d, The particular manner of constructing the rotary cutters, C′, to wit by having blades, h, fitted between the two parts, i, i′, of a hub, D, which parts are secured in contact by a screw-nut, j, one of the parts being notched to receive the inner ends of the blades, h, substantially as shown and described.

3d, The arrangement of the racks, G, G, fenders, A*, frame, A, and cutters, C′, relatively with each other, and operating in the manner and for the purposes herein specified.

4th, The lever, I, provided with the clamps, J, and arranged relatively with the upper edges of the racks, G, as shown and described, for the purpose of preventing the casual tilting of the racks, as described.

55,841.—BRICK MACHINE.—Josiah S. Elliott, East Boston, Mass.:

I claim, 1st, The operating of the carrier, N, by means of the levers, P, connected with the sleeve, K, to which the arm, O, of the carrier is attached, and actuated by the cam, Q, substantially as shown and described.

2d, The operating of the mold, G, by means of the bars, H, H, arms, c, c, and toothed segment, J, on shaft, I, toothed segment, K, and cam, L, all arranged substantially as and for the purpose specified.

3d, The rods, r, arranged and operated substantially as shown and described, for insuring the proper filling of the carrier, as set forth.

4th, The sweep, V, arranged and applied to operate substantially in the manner as and for the purpose set forth.

55,842.—DRESS-ELEVATOR.—Henry Essex, West Haverstraw, N. Y., and Job Johnson, Brooklyn, N. Y.:

We claim the fastening for garments formed by the spring, a, eye, 3, and pusher, 2, combined with the sliding-ring or slide, b, as and for the purposes set forth.

55,843.—BROOM HEAD.—S. S. Evans, El Paso, Ill.:

I claim an improved broom, formed by combining the ring, A, and handle, B, constructed as described, with each other, and with the clasp, D, and corn, C, substantially as described and for the purpose set forth.

55,844.—HYDRAULIC SPINDLE AND TURNING APPARATUS FOR DRAW-BRIDGES.—Philip L. Fox and George P. Herthel, Jr., St. Louis, Mo.:

We claim, 1st, The application of fluid pressure to the pivot of turning bodies, when used to raise the same and diminish the friction resistance to the turning motion, substantially as described and shown.

2d, The counter-balance, when operating in connection with such fluid pressure in raising the structure to be turned, substantially as shown and described.

3d, The combination and arrangement of the pivot, C, and cylinder, D, in conjunction with the counter-balancing apparatus, E, and the pump, F, all acting substantially as and for the purposes shown and described.

4th, The ring surface, M, the friction-rollers, N, the gearing, N′, when used in combination substantially as and for the purposes set forth.

55,845.—MODE OF MAKING TIN FRUIT CANS.—John M. Francis, Walds, Ohio:

I claim the section, A, and wedge, B, connected by strips, a and b, arranged in the manner and used substantially as and for the purposes herein set forth

55,846.—TABLE-LEAF SUPPORT.—George Fyfe, Ottawa, Ill.:

I claim, in combination with the leaf of a table, the hinged arm, F, and the frame, C, the peculiar arrangement of the spring, G, operating upon said arm, F, as and for the purposes specified.

55,847.—FEEDING-WHEEL FOR SEWING MACHINES.—Anton Galleth, New York City:

I claim the arrangement of the wheel, A, lever, B, with its side, G, as described, block, E, spring, F, and friction spring, J, combined and operating in the manner and for the purpose herein specified.

55,848.—ROLLER AND CORN-STALK CUTTER.—Roland R. Gaskill, Mendota, Ill.:

I claim, 1st, The combination of the roller, A, and knife, H, the two being so connected by intermediate mechanism, as that the knife shall fall with the forward movement of the roller, substantially as and for the purpose set forth.

2d, The combination of the knife, H, rod, G and G′, and levers, E, and arm, F, substantially as and for the purpose set forth.

3d, The roller, A, with pins, B, in combination with the levers, D and E, and knife, H, substantially as and for the purpose set forth.

55,849.—BABY-JUMPER.—William Gibson, Fort Wayne, Ind.:

I claim, 1st, The extensible post, A, A′, in combination with step and cap pieces B, C, substantially as described.

2d, The combination of a spring, D, or its equivalent, with an extensible post, A, A′, substantially as described.

3d, The combination of a strap or cord, G, a spring, D, and a post which will rotate where it is erected between two fixed objects, substantially as described.

55,850.—HAND CORN PLANTER.—William Gilbert, Bardstown, Ky.:

I claim the hand seed planter, constructed, arranged, and operating substantially in the manner described for the purpose set forth.

55,851.—FRUIT BASKET.—Isaac C. Gleason, Middletown, Conn.:

I claim a polygonal fruit basket having tapering sides formed of a single piece cut partially through to form the angles of the sides, its ends being secured together by eyelets, and having a circular bottom held in place by its edge fitting into slits formed in the said sides near their lower edge, substantially as described and for the purpose set forth.

55,852.—LACING FOR BOOTS AND SHOES.—Charles Goodyear, Jr., New York City:

I claim, 1st, The method herein described of applying lacing eyelets to boots and shoes by inserting and fastening the same in between two sheets or thicknesses of leather, in such manner that the lacing-eye alone shall protrude at and at right angles to the edge of said leather, substantially as herein shown and set forth.

2d, The lacing-eyelet constructed substantially as herein shown and described, that is to say, forming the same of a single piece of wire, the ends of which are bent into eyes standing at right angles to each other, substantially as herein set forth.

3d, In combination with eyelets constructed substantially as herein described, I claim the employment of rivets traversing one of the eyes of the lacer and either or both thicknesses of leather between which the said lacer is confined.

4th, The employment in combination with lacers and rivets, as heretofore described, of a folded leather welt, binding, or equivalent, the folded edge of which having at right angle to it incisions through which the lacing eyes protrude, substantially as herein shown and described.

55,853.—LACING FOR BOOTS AND SHOES.—Charles Goodyear, Jr., New York City:

I claim, 1st, The method herein described of applying lacing eyelets to boots or shoes by securing and holding a series of eyelet-rings in their proper positions, as set forth, by means of a single holding device which serves as the common support of said rings, as and for the purposes herein shown and described.

2d, As lacing eyelets, I claim rings in combination with one or more fastening devices as set forth, holding the said rings to the edge or to the face of the welt or upper, at right angles thereto, and transversely to the length of the shoe, as and for the purposes herein described.

3d, In combination with rings for forming the lacing eyes as described and for the purpose of holding the same in their proper positions as set forth, I claim the wire imbedded between the folds of the welt or two thicknesses of leather, so that the eyelets may be strung or held on a support common to all, as and for the purposes herein shown and described.

4th, In combination with the eyelet-rings, as described, I claim the wire corrugated or bent at the points of support of the rings, substantially in the manner and for the purposes herein set forth.

55,854.—BUCKLE.—J. F. J. Gunning and Isaac T. Meyer, New York City:

We claim a buckle made of one piece of metal, wire, or other suitable material, bent so as to form a shank, a, and two spring jaws, b, c, substantially as and for the purposes set forth.

55,855.—DISTILLING PETROLEUM AND OTHER LIQUIDS.—C. H. Hall, New York City:

I claim, 1st, In the continuous distillation of petroleum or other liquids, the use of a retort, B, in combination with furnace, D, and arch, C, substantially as shown and described and for the purpose set forth.

2d, The series of scrapers, h, h, h, or their equivalent, connected to the rod, m, in combination with retort, B, constructed and operating substantially as shown and described, or in any other manner whereby a scraper is used for the purpose specified.

3d, The device herein described for generating steam, consisting of the water-jacket, G, and water supply-pipe, Y, and steam tube, I, in combination with condensing tube, F, substantially as shown and described, or any other means whereby steam is generated by passing the vapors of oil or other liquids, being distilled, through a vessel containing waters, or *vice versa*.

4th, The method herein described of separating the condensible from the non-condensible gases, or any other method whereby the condensible gases are made to collect in the lower part of a receiver, while the non-condensible gases are made to pass off by the suction of a current of steam, substantially as herein set forth and for the purpose specified.

5th, The water-jacket, G′, connected with supply-pipe, H, and water-tank, R, in combination with tubular condenser, F, operating as described, or in any other manner to accomplish the purpose specified.

6th, The receiver, L, in combination with tubular condenser, F, steam-pipe, K, and discharge-pipe, O, operating substantially as and for the purpose shown and described.

7th, The annular chamber, E, composed by an inner and outer vessel, in combination with the condenser, F, constructed and operating substantially as and for the purpose specified.

8th, The method herein described of freeing the retort, B, from residuum, or any other equivalent means, whereby a retort or still is freed of its residuum by the force of a jet of steam, operating substantially as shown and described.

9th, The within-described process of cleaning the residuum by treating it with steam and water, substantially in the manner described and for the purpose set forth.

55,856.—BROOM-HEAD.—Martin Haneline, Clear Creek, Ind.:

I claim, 1st, The wooden frame, A, and the metallic plates, B, constructed and combined substantially as described and for the purpose set forth.

2d, The combination of the screw, C, and staple, D, with each other and with the wooden frame, A, substantially as described and for the purpose set forth.

55,857.—BUTTER-WORKER.—William H. Hart, Medfield, Mass.:

I claim, 1st, The combination consisting of the table, A, inclined table, e, sliding-receiver, g, churn, h, and salt receptacle, a′, when constructed and arranged substantially in manner and to operate as herein-before described.

And in connection with such a combination of parts, I claim the heater surrounding the churn, essentially as set forth.

55,858.—BOOT OR SHOE.—Gilbert Hawkes, Lynn, Mass.:

I claim, 1st, An inner sole, A, formed of a textile fabric, to be used either with or without a stiffening preparation, as set forth and described.

2d, A strip, B, of a textile or any other suitable material, when used as and for the purpose specified.

3d, The combination of an inner sole, A, formed of a textile material, with a strip, B, of any suitable material, as and for the purpose specified.

4th, The application to the lasting of boots and shoes sewed by machinery of an inner sole of textile material, substantially as described.

55,859.—NECK-TIE FASTENING.—John G. Hitchcock, New York City:

I claim, 1st, The spring-snap, A, having the cross-stop, a2, on the socket, a, and the locking-end, b2, on the catch, b, arranged as represented and having an opening, d, in the front of the socket, a, adapted to receive pressure as indicated, substantially in the manner and for the purpose herein set forth.

2d, A neck-tie, one end of which is held by a clasp behind the bow, and the other is held adjustable by a hook and loops, all substantially as shown and described.

55,860.—MACHINE FOR CUTTING FLY-NETS.—Austin D. Hoffman, Detroit, Mich.:

I claim, 1st, The combination of two or more guillotine knives with an intermittently moving cutting-board for carrying the leather which moves in a direction transverse to the length of the knives.

2d, The combination with the said guillotine knives of the spring-block, T, arranged substantially as described, for detaching the leather from the knives.

3d, In combination with a pair of guillotine knives, I claim a vertically moving strip between the blades to disengage the leather therefrom.

55,861.—MACHINE FOR FINE-CUTTING TOBACCO.—Elijah Holmes, Lynn, Mass.:

I claim the knife, D, the bed-plate, G, and the gauge-plate, E, combined and arranged in the manner and for the purposes specified, substantially as above set forth.

55,862.—LAMP-CLEANER.—Benjamin F. Horn, Boston, Mass.:

I claim my improved lamp chimney-cleaner as made with the loop-spring, D, or its equivalent, and the crook, E, arranged and combined with the series of covered bow-springs and the handle, arranged and applied together substantially as specified.

55,863.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Working a button-hole automatically and on both side without turning the cloth by the devices, substantially as described.

2d, The scroll cam ratchet-wheel to give a rectilinear reciprocatory motion to and govern the length of the button-hole, substantially as described.

3d, The combination of the scroll cam ratchet-wheel, shifting pawl, and jog-bar, substantially as and for the purpose set forth.

4th, The combination of the scroll cam ratchet-wheel, the sweep bent-lever, and jog-bar, to space the stitching, substantially as set forth.

5th, The combination of the reciprocating vibrating clamping plate, the adjustable switch-wedge, and the jog-bar, for the purpose of varying the length of stitching for a button-hole, substantially as described.

6th, The combination of the jog-bar, clamping-plate, movable switch, and switch-block, to sew both sides of button-holes automatically, substantially as described.

7th, The combination of an adjustable stitching-plate with the fixed bed-plate, substantially as and for the purpose set forth.

8th, The combination of the clamp to hold the cloth with an adjustable screw-pivot to render the bearing surface of the clamp parallel with cloth of varying thicknesses, substantially as set forth.

9th, The combination of the vibrating and reciprocating plate with the adjustable clamp, when so arranged that both shall move together to hold the cloth smoothly between them, as set forth.

55,864.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Working button-holes automatically above or below the bed-plate of sewing machines, substantially as and for the purpose set forth.

2d, Sewing button-holes automatically, giving the goods a progressive rotary and a vibrating movement from a center, to stitch the sides and ends of the button-hole with stitches of uniform length.

3d, The combination of a jog-bar, a rack-bar, and a ratchet-wheel with the cloth-holder, substantially in the manner and for the purpose set forth.

4th, The combination of a jog-bar, a pawl-lever, and toothed wheel with the cloth-holder, substantially as and for the purpose set forth.

5th, The combination of a jog-bar, a crank-lever, and supporting beam, L, with the cloth-holder, substantially in the manner and for the purpose set forth.

6th, The combination of an adjustable slide with the feed-device and cloth-holder, substantially in the manner and for the purpose set forth.

7th, The combination of a jog-bar, a pawl-sweep, and a ratchet-wheel with the cloth-holder, substantially as and for the purpose set forth.

8th, The jog-bar, when combined with the cloth-holder and pawl-sweep, substantially as described to give the cloth-holder all its required motions, to vary the spacing between the stitches, and to adapt the sewing to button-holes of different lengths, substantially in the manner described.

55,865.—BUTTON-HOLE SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st Operating the button-hole mechanism from the spooling-pin, substantially as and for the purpose set forth.

2d, The bed-plate, E, having a reciprocating motion and being laterally and longitudinally adjustable, substantially as and for the purpose set forth.

3d, The revolvable, reciprocating feeding-plate, combined with the vibrating bed-plate, substantially as and for the purpose described.

4th, The adjustable stitching-plate, combined with its eyelet guide, substantially as and for the purpose described.

5th, The combination of the center-plate and gibs, substantially as and for the purpose set forth.

6th, The dog-lever, combined with the center-plate, the block-cramp, and the revolvable plate, substantially in the manner and for the purpose described.

7th, The combination of the clamping-lever with the revolvable plate, substantially as described, to admit of the turning of the cloth, so that the button-hole can be worked at a right angle or less than a right angle to the selvage, or parallel therewith.

8th, The combination of the grooves in the rotating plate with those in the clamping-lever, substantially as and for the purpose set forth.

9th, The feeding-screw to intermittently reciprocate the feeding-plate, or hold it at rest, substantially as and for the purpose described.

10th, The combination of the feeding-screw with the feeding-plate by spring half-nuts, substantially as and for the purpose set forth.

11th, The combination of the feeding-screw with the bed-plate and adjustable plate on the switch cam-plate, substantially as and for the purpose set forth.

12th, The combination of the switch, the jog-bar, and the slotted strap, substantially as and for the purpose set forth.

13th, The combination of the jog-bar with the adjustable slide-bar, substantially as and for the purpose set forth.

14th, The combination of the bed-plate and shield-cap, substantially as and for the purpose set forth.

15th, The combination of the bed-plate and table with the adjustable lever and stitching plate, substantially as and for the purpose described.

16th, The combination of the bed-plate, jog-bar, lever, and stitching-plate, substantially as and for the purpose described.

17th, The combination, of the friction-spring and adjustable stops of the throw-lever y, with the jog-bar and its stop-pin, substantially in the manner an for the purpose described.

18th, The combination of the plate and its adjustable screws and pins with the switch-cam and jog-bar, substantially as and for the purpose set forth.

55,866.—SEWING-MACHINE CLAMP.—James A. and Henry A. House, Bridgeport, Conn.:

We claim, 1st, Surrounding the opening in the table of sewing machines, through which the needle passes, with a lining of india-rubber, substantially in the manner and for the purpose set forth.

2d, The combination of the yielding presser with the rubber-lined opening, substantially as and for the purpose set forth.

55,867.—KNIFE AND SCISSORS SHARPENER.—M. V. B. Howe, Ashburnham, Mass.:

I claim the combination of holder, A, having angular notches, E, and concave sharpener-plate, C, as and for the purposes described.

55,868.—TRUSS.—N. W. Hubbard, Fulton City, Ill.

I claim a truss in which a pad of the form and arrangement substantially as set forth is connected in the manner set forth with a main spring of the form and rigid character, substantially as herein described.

55,869.—PUNCTURING MACHINE FOR MAKING PATTERNS.—Samuel Huffman, Carthage, Ill.:

I claim a machine, when so constructed with a puncturing point in combination with a spring, and when the machine entire is movable when in use, as is a pen or pencil tracing-point, substantially as herein described and for the purpose herein set forth.

55,870.—CAR COUPLING.—Hiram Hughes, Savona, N. Y.:

I claim the combination of the latch, B, with its catch, c, and pendants, d, d′, of the form shown, and the pivoted bar, D, operating in combination with a suitable link, E, in the manner and for the purpose herein specified.

55,871.—FERTILIZER.—Joseph and Abraham Hursh, Philadelphia, Pa.:

I claim the application of ochre as a fertilizer, in either a raw or burnt state, substantially as described.

55,872.—GRINDING MILL.—John Hutchinson, Three Rivers, Mich.:

I claim the slip coupling in combination with the central shaft having stirrers and the hopper, arranged and operating as described.

© 1866 SCIENTIFIC AMERICAN, INC.

55,873.—WASHING MACHINE.—Andrew Irion, Femme Osage, Mo. Ante-dated May 14, 1866:

I claim the combination of the wheels, B, C, C′, and crank-shaft, D, with the rubbers, F′, and box, A, as and for the purpose set forth.

55,874.—FENCE.—Theodore E. King, Painesville, Ohio:

I claim, 1st, The plate, A, constructed as shown in Figs. 1 and 2, and herein particularly specified and used in series by overlapping or interlocking each other consecutively, for the purpose set forth.

2d, The plate as shown in Figs. 3 and 4, and constructed as specified, the same consisting of the addition to the foregoing plate of a vertical or upright part and arched braces, L, L, and used in series in like manner, as and for the purpose specified.

3d, The manner of plating or strapping the couplings of the sections and covering their abutting ends, together with the mode of adjusting and bracing the panel, J, by means of the combined parts herein described viz., plates Figs. 5, 6, 7, and 8, projecting plates, L′ M and M nuts, O and T, and bolts, R and S, arranged and operating as herein set forth.

4th, The adjustable hinge constructed with the depressions, a, a, a, a, and slots, U, U, substantially as shown in Figs. 10 and 11, in combination with the tooth, b, and screw-holes, c, c, of the lower plating of the gate, as herein described and for the purpose specified.

5th, The adjustable catch, as shown in Figs. 14 and 15, provided with the screw-bolt, W, and projecting stud, X, in combination with the opening, Y, of the post, and constructed and arranged as and for the purpose set forth.

55,875.—WATER WHEEL.—Louis Kratzer, Baltimore, Md.:

I claim the arrangement of the wheels, A, B and C, so as to make use of the whole body of water in its descent to the level below, and its action in passing off, as herein set forth and described.

55,876.—FARM GATE.—Joel Lee, Galesburg, Ill.:

I claim, 1st, The friction rollers, A, A, when used as set forth and described.

2d, The arrangement of rollers, A, A, with the roller, B, and the roller support, C, all arranged as set forth and described.

55,877.—HARVESTER RAKE.—Edward J. Leyburn, Lexington, Va.:

I claim, 1st, Combining a rake with a revolving reel in such manner that the rake shall receive a rectilinear movement across the platform at every revolution of the reel, and without stopping the movement of the latter, substantially as described.

2d, Supporting and guiding a rake-staff, D, by means of a revolving reel in such manner that the rake shall revolve with the reel after the termination of each raking stroke, and then move across the platform in a line which is at right angles or nearly so to the line of draught, substantially as described.

3d, Supporting and guiding the rake-staff by means of a slotted cross-piece, b2, applied to the reel and arranged so that the rake, D′, shall be held a right angles to the finger-beam in its passage across the platform substantially as described.

4th, A rake which is applied to a revolving reel and moves in a right or nearly right line across the platform, in combination with means which finally discharge or deliver the gavels of grain with their length at right angles or nearly so to the path of the machine, and also out of the return track of the horses, substantially as described.

5th, A rake which moves in a right or nearly right line across the platform, so pivoted to the reel that it is capable of swiveling and vibrating, substantially as herein described.

6th, In combination with a revolving reel and vibrating rake, I claim pivoting the rake to its staff, substantially as described.

7th, Providing for moving the rake to the outer end of the reel previously to the action of the guide-arm, b1, upon the standing grain, substantially as described.

8th, The rake pivoted to the reel so as to revolve with it, constructed and controlled substantially in the manner and for the purpose described.

55,878.—CAN-OPENER.—O. J. Livermore, assignor to himself and Clark, Lawyer & Co., Worcester, Mass.:

I claim a can-opener, constructed substantially as above described.

55,879.—TAG OR LABEL FOR EXPRESS COMPANIES, ETC.—E. A. Locke and L. Heüser, Boston, Mass.:

We claim, 1st, The combination of the two parts of the tag, a and b, when united by the folding of the end of a over and with b, and perforated through the reinforcement of the folds for reception of the band.

Also, in combination with a tag and band a projecting unclinched eyelet secured to the band by the confinement of its head or flanch between the adjacent surfaces of the parts eyeleted together, to secure the tag to the band, the eyelet being thus held in position for application and securement of the opposite end of the band, substantially as set forth.

55,880.—BURNING-FLUID.—David Mansfield, Oshkosh, Wis.:

I claim a burning-fluid for illuminating purposes which is composed of the several ingredients mixed together in about the proportions herein mentioned.

55,881. CARDING MACHINE.—James McDonald, Detroit, Mich.:

I claim, 1st, The use of a thin shell in the place of the thick and wooden one heretofore used, which thin shell is set in combination with the roller for the purpose of taking the wool from the roll-doffer at once without comb-crank or intermediate roller, said shell being set closer up to the roller than heretofore, and made adjustable nearer to or far from the roller at will.

I also claim, as a component part of said improvement above described, the insertion of narrow bits of wool-cards (the teeth of which should be a trifle shorter than, and set contrariwise to, the ordinary card-teeth of the roll-doffer) in the spaces of the roll-doffer heretofore left suitable and unfurnished with cards or teeth, and the change above prescribed in the size of the pulleys, by means of which pulleys the band of the machine turns the roller and roll-doffer.

55,882.—GATE FOR FOREBAYS.—J. J. Meeker and Levi Cartright, Columbia, Pa.:

We claim the flexible gate, B, constructed and operating substantially as and for the purposes set forth.

55,883.—FENCE.—S. H. Mitchell, El Paso, Ill.:

I claim, 1st, The stakes, B, D, connected by bolts, C, in combination with the upright posts, A, of the panels with which posts the upper ends of the stakes, B, are connected by bolts, E, substantially as and for the purpose specified.

I also claim the covering of the notched ends of the slats, F, of the panels with sheet-metal or strap-iron, c, substantially as and for the purpose set forth.

I further claim the securing of the panels so as to prevent a vertical movement of the same by means of a screw, b, or its equivalent, applied as shown, when used in combination with the notched ends of the slats. F, of the panels, substantially as described.

55,884.—WELL-BORING APPARATUS.—David Morris, Bartlett, Ohio:

I claim, 1st, A drill having two or more wings, W, with their cutting edges constructed and arranged as herein described and represented.

2d, The tube, H′, provided with a valve, h, and attached to, and moving with, the drill-rod, h, substantially as and for the purpose explained.

3d, The combination of the circular frame, A, cogged rim, C, rotating and revolving shaft, D1, pinion, D2, crank-wheel, F, connecting-rod, G, rope, I, and drill, H, the whole being constructed and arranged as herein described and represented.

4th, The combination of the cogged rim, C, and gearing, S, S, with the beveled gear, R, windlass, Q, shifting-rod, S, rope, N and adjustable block, L, the whole being arranged to operate in the manner and for the purpose set forth.

55,885.—FLOUR PACKER.—John Musser, Frizellburg, Md.:

I claim the movable evers, E, operating on the vertical stampers. G, with the upright revolving cylinder, J, when arranged, combined, and operated as herein described and for the purpose set forth.

55,886.—APPARATUS FOR AGITATING AND HEATING SUBSTANCES.—George Nebeker, Wilmington, Dl.:

I claim a tube, A, in combination with an internal pipe, B, and with a tube, C, communicating with the said pipe, B, and with a steam boiler, substantially as and for the purpose described.

55,887.—SUGAR-MOLD.—Frederick Nishwitz, Williamsburg, N. Y.:

I claim, 1st, Combining a sugar-mold tip with a body of papier-mache, or other equivalent material, the two parts being constructed and arranged substantially as described.

2d, Clanping the body of the mold to the tip, and holding the two parts in place by means of a wrapping of wire, substantially as described.

3d, Combining with the dovetailed flange on the tip the shoulder on the body of the mold, when the latter acts as a stop to prevent the wrapping from slipping off the cone, substantially as described.

55,888.—SUGAR-MOLD TIP.—Frederick Nishwitz, Williamsburg, N. Y.:

I claim, 1st A separate and separable tip for sugar-molds, constructed and operating substantially as described.

2d, Clamping the body of the mold between an inner metallic tip and an outer metallic cap, substantially as described.

55,889.—EYE-WATER.—Michael Noll, New York City:

I claim the herein-described eye-water, composed of sulphate of zinc and the white of an egg dissolved in distilled water, substantially as set forth.

55,890.—MILL SIEVE.—E. D. Norton, Bradford, Pa.:

I claim an improved screen or upper sieve for a fan-mill, formed of strips, B, of corrugated sheet-metal, attached at their ends to the side-bars of the frame, A, of the sieve, and so arranged that the forward edge of each strip, B, shall overlap the rear edge of the adjacent strip and that the concavities, b′, of each strip shall be in the same vertical plane with the convexities, b2, of the adjacent strips, substantially as herein described and for the purposes set forth.

55,891.—ROOFING.—Rufus Norwood, Baltimore, Md.:

I claim, 1st, A roof which is in part composed of several overlapping strips of felt, or its equivalent, applied in counter-diagonal positions, substantially as described.

2d, The combination of the several strips, c, c, and strips, d, with the felting, as described, so that gutters or channels at the junction of the roof with the fire-wall can be formed, preventing thereby the cement covering from being detached from the roof and wall, substantially as described.

55,892.—CARBON BATTERY CONNECTION.—Aaron S. Ogden, Newark, N. J.:

I claim surrounding the junction of the wire, A, with the platina, and a portion of the said wire, A, with the covering, B, or its equivalent; also the combination of the carbon with the said covering, B, and platina, D, substantially as described and for the purposes set forth.

55,893.—HYDRANT.—James Old, Pittsburg, Pa.:

I claim, 1st, Connecting the operative parts of the hydrant to the supply or service-pipe at a point below the working valve or cock by means of a joint, in such manner that the hydrant may be removed and separated from the supply or service-pipe without cutting any pipe or unscrewing any joint, substantially as herein-before described.

2d, So constructing the hydrant, substantially as herein-before described, as that all the operative parts above and including the working cock or valve are connected together as one piece, and may be attached to a removable slide, either placed in or forming part of the hydrant-box, substantially as and for the purposes herein-before set forth.

3d, The check-valve placed below the working-valve of a fire-plug or hydrant, so constructed and arranged as that the valve will shut whenever the hydrant or fire-plug is removed from the supply or service-pipe, and that it shall be opened to allow of the passage of water from the supply-pipe either by the opening of the working valve whenever the fire-plug is used, or be kept open by the plug or hydrant when it is placed in connection with the supply or service-pipe, substantially as herein-before described.

55,894.—LIFTER FOR STOVE-COVERS AND CULINARY VESSELS.—Joseph Old, Reading, Pa.

I claim the described universal lifter, constructed with hooks, C, D, in combination with the fixed jaws, A, B, at one end, the other being prolonged into a handle, E, in the manner and for the purpose specified, as a new article of manufacture in design and figure.

55,895.—DRILL COUPLING.—Edward E. and Charles T. Packer, Philadelphia, Pa.:

We claim a section having an external screw-thread and a recess, in which is a spring-spline or feather, in combination with a section having a socket with an internal screw-thread and a slot adapted for the reception of the end of the said spline or feather, the whole being constructed substantially as and for the purpose specified.

55,896.—SHEEP-RACK AND HOLDER.—Enos Page, Streetsborough, Ohio:

I claim the adjustable sides, B, B, lips, b′, b′, and grooves, a, a′, in combination with the cleat, D, and buttons, D′, arranged as and for the purpose set forth.

55,897.—BOOK-HOLDER.—Owen B. Parker, Woodville, Mass.:

I claim the combination as well as the arrangement of the two bars, A, B, their lips, a, a, b, b, and leaf-holders or arms, D, D, with the elastic bands, C, C.

I also claim the combination and arrangement of the brace-hole and looped strap or ribbon, with the two bars, A, B, and their lips, a, a, b, b, the elastic connections, C, C, and arms, D, D.

I also claim the combination and arrangement of the brace or prop and the looped strap, with the two bars, A, B, their lips, a, a, b, b, elastic connections, C, C, and arms, D, D.

I also claim the combination of the fingers, g, g, with the arms, D, D, the bars, A, B, their lips, a, a, b, b, and elastic connections, C, C, the whole being as and for the purpose set forth.

55,898.—MEDICINE TO CURE CHOLERA, ETC.—Anna E. Parrott, Norfolk, Va.:

I claim the medicine prepared substantially as herein described.

55,899.—CORN-SHELLER AND BEAN-THRASHER.—Benjn. P. Pendexter, Mechanic's Falls, Me.:

I claim combining the feeding-drum, C, having horizontal buckets, m, and hooks, n, on the outside, with the toothed beater, D, the elastic concave toothed bed, E, made in sections, the elastic bed-plates, F, supported and operated by the spiral springs, b, the fan, G, the sieve, H, and the elevator, I, the whole several parts being constructed, connected and arranged, substantially as and for the purposes herein described.

55,900.—WATER-CLOSET.—Barton Pickering, Milton, Ohio:

I claim, 1st, The arrangement of the vessel, A, seat, B, and valve, C, the whole constructed substantially as described and for the purposes set forth.

2d, The arrangement of the spring, f, and bar, p, to hold the seat, B, in a vertical position, and the valve, C, in a nearly horizontal position, substantially as described and fort he purposes specified.

55,901.—SKATE.—J. M. Plimpton, New York City

I claim, 1st, The construction of the plates, B, and hangers, C, arranged and applied to the stock or foot-stand, to operate in the manner substantially as and for the purpose set forth.

2d, The key, F, provided with the slots, j, J, and the button, G, and arranged in connection with the pin, K, substantially as and for the purpose set forth.

3d, The springs, p, applied to the screws, n, which secure the hangers, C, to the plates, F, for the purpose of preventing vertical or upward and downward play of the hangers, and controlling the turning, tilting, or canting of the stock or foot-stand, as set forth.

4th, The clamps, H, composed of two parts, g, r, for holding the reversible runners, I.

5th, The reversible runners, arranged substantially as shown, for the purpose specified.

55,902.—HORSE HAY-FORK.—Isaac T. Price, Leesville, Ohio:

I claim, 1st, The combination and arrangement of link, C, hook, H, catch, G, and trigger, Q, substantially as and for the purpose set forth.

2d, The construction and arrangement of the handle, B, head, A, and prongs, p.

55,903.—LOCOMOTIVE LAMP.—James Radley, New York City:

I claim the combination of the lamp with the oil-tank by means of one or more small oil-tubes incased with a non-conductor of caloric, arranged and constructed in the manner substantially as described.

55,904.—ENGINE HEAD-LIGHT.—James Radley, New York City:

I claim, 1st, The foundation piece, with its recess and covering-plate, in combination with the inclosing tube and the wick so arranged and constructed that the parts may be conveniently brazed together instead of being soldered, thereby rendering the lamp more safe and permanent, substantially as herein shown and described.

2d, The wick-pinion and its spindle, in combination with the removable stuffing-box, arranged and constructed substantially as described.

55,905.—MOWING MACHINE.—Amos Rank, Salem, Ohio:

I claim, 1st, The construction of the hanger, E, with a depressed stirrup, E′, which is open on all sides but one above the shaft, e, and below the shaft, b, substantially in the manner and for the purpose described.

2d, The combination of the hanger, E, constructed with the open stirrup, E′, and the rear hanger, F, all constructed and arranged substantially as described.

3d, Constructing the front hanger, E, E′, so that it can be attached to the top of the longitudinal beams, A, A, and at the same time will serve as a support for the two shafts, e, b, in the manner substantially as shown and described.

4th, The hanger, E, and open stirrup, E′, cast in one piece, substantially as shown and described.

55,906.—FENCE-GATE.—F. Raymond and A. Miller, Cleveland, Ohio:

We claim the cord, h, adjustable case, e′, and sheave, e, in combination with the gate, A, arm, F, when arranged and operating substantially as and for the purpose set forth.

55,907.—WINDOW-SHADE.—Henry Read, Ypsilanti, Mich.:

I claim the combination of the staples or rings, C, C2, C3, or their equivalents, cords, E, E, secured to a tassel, D, either weighted or not, when arranged and connected together and to a window-curtain or shade so as to operate thereon, substantially as and for the purpose described.

55,908.—CORN-PLANTER.—W. E. Rich, New Providence, Iowa:

I claim, 1st, The hinged bars, D, D, provided with the rollers, i, and boxes, G, in connection with the wheels, H, having seed-cells, b, made in them and rods, c, attached with weights, f, at their upper ends, all arranged to operate in the manner substantially as and for the purpose specified.

2d, The hoes, F, attached to the rear ends of the bars, D, in combination with the seed-dropping mechanism attached to said bars, D, for the purpose set forth.

3d, The rollers, I, I, in combination with the seed-dropping mechanism and covering-hoes, substantially as and for the purpose specified.

4th, The attaching of the rollers, i, to arms, g, pivoted to the bars, D, and retained in position by bars, i*, and pins, j, arranged substantially as shown and described for the purpose of adjusting the bars, D, as set forth.

55,909.—AUTOMATIC MACHINE FOR LIGHTING AND EXTINGUISHING GAS.—H. Stone Richardson, assignor to himself and E. P. Russell, Manlius, N. Y.:

I claim, 1st, The setting-wheel, C, in combination with the hands, d and e, shafts, g and h, and cams, D, D′, substantially as and for the purposes set forth.

2d, The match cylinder, G, constructed and operating substantially as and for the purposes set forth.

3d, The dogs, K, K′, and K2, in combination with cylinder, G, and plate, J, substantially as and for the purposes set forth.

4th, The cams, D, D′, cam-levers, N, N′, connecting-levers, O, O dog-levers, L, L′, and springs, P, P′, constructed and arranged substantially as and for the purposes set forth.

5th, The setting-wheel, C, provided with cog-wheel, j, when so combined with cock cog-wheel, i, as to alternately turn the gas on or of, substantially as herein set forth and described.

6th, The draught-pipe, H, operating substantially as described and in combination with the match-tubes, K.

55,910.—REAPING MACHINE.—E. P. Russell, Manlius, N. Y.:

I claim, 1st, The "side-dumper," O, or its equivalent, substantially as and for the purposes set forth.

2d, The dumper-reel, H, in combination with the side-dumper, O, substantially as and for the purposes set forth.

3d, The combination of the dumper-reel, H, side-dumper, O, and track-clearer, U, substantially as and for the purposes set forth.

4th, The device used for tripping the dumper-reel, substantially in the manner described.

5th, The device used for tripping the side-dumper, substantially in the manner described.

55,911.—MEDICAL COMPOUND.—W. F. Salie, Bowdoinham, Maine:

I claim a medical compound composed of the several ingredients herein named, and either with or without a flavoring material or substance, when mixed together in about the proportions described, as and for the purposes specified.

55,912.—MACHINE FOR MAKING HORSE-SHOE NAILS.—George W. Sargent, Fairhaven, Mass., and Benjamin P. Rider, Chelsea, Mass.:

We claim, 1st, Operating the hammers, C, C. C′, C′, by means of the sliding connecting pieces, D, and cam, F, substantially as and for the purpose specified.

Also, the adjustable boxes, G, in combination with the cam-shaft, E, connecting pieces, D, and the hammers, as and for the purpose specified,

© 1866 SCIENTIFIC AMERICAN, INC.

55,913.—RAILWAY SWITCH.—Charles H. Sawyer, Hollis, Maine:

I claim, 1st, The combination of the jointed levers, h, with the sliding bar, g, and curved arms, a, with the cross-bar, b, all constructed. arranged, and operating as herein set forth and described.

2d, The arrangement of the springs, y, to lift the levers, i, as described.

3d, The arrangement of the arms, z, z, for the purpose of locking and unlocking the switch by hand, as described.

55,914.—AUTOMATIC GATE.—J. H. Schenck, Chicago, Ill.:

I claim, 1st, The gate, A, pivoted at the top of the post so as to swing like a pendulum, when the way is to be opened, substantially as described.

2d, In combination with the vibrating gate, A, the reciprocating platform, f, for the purpose set forth.

3d, In combination with the vibrating gate, A, the latch, substantially as and for the purpose set forth.

4th, The reciprocating platform, supported upon the lary bars, and connected to the gate by the rod, substantially as described.

5th, In combination with the reciprocating platform and the flanges, substantially as described and for the purpose set forth.

55,915.—APPARATUS FOR PRODUCING EXTRACT OF HOPS, ETC.—John Schneider, Williamsburg, N. Y.:

I claim the siphon-tube, E, in combination with the tightly-closed vessel, A, which is provided with a horizontal partition or spurger, D', false bottom, C, and discharge coil, F, substantially as and for the purpose described.

55,916.—MANUFACTURE OF CAR WHEELS.—J. Scoville, Buffalo, N. Y.:

I claim the combination of spiegeleisen and iron in the manufacture of car wheels, in the manner herein described.

55,917.—PICTURE NAIL.—Frederick J. Seymour, Wolcottville, Conn.:

I claim an ornamental picture nail-head made with a screw for the nail, in the manner specified.

55,918.—DRILLING MACHINE.—Frederick Shaller. Hudson, N. Y.:

I claim, 1st, The fixed feed-screw, E, the hand-wheel, F, containing the nut, x, and the arms, i, a and b, in combination with the drill-spindle and frame, B, of the machine, all arranged substantially as herein specified.

2d, The combination of the frame, f, f, the drill-spindle, C, the pulley, D, and rod, d, substantially as and for the purpose herein set forth.

55,919.—MACHINE FOR CUTTING WINDOW-SHADE SLATS.—P. P. Simmons, Davenport, Iowa:

I claim, 1st, The arrangement of the nearly horizontal rotary cutters, C, C, table, A, and the guides, a, a, substantially in the manner and for the purpose described.

2d, The arrangement of the pocket-bearings, D, cutter-arbor, b, cutter, C, adjustable devices, c and d, and table, A, substantially in the manner and for the purpose described.

55,920.—GARBAGE BOX.—James Joseph Slevin, New York City:

I claim, 1st, The garbage box, with its top constructed so as to form a part of the sidewalk of the street, and with a door or lid in said top, so that the said top with its door covers the garbage box, forms part of the sidewalk for pedestrians, and permits the contents to be readily thrown out, thus enabling the garbage box to be sunk below the level of the sidewalk, as described.

2d, The construction of the garbage box with two horizontal doors, to form parts of the sidewalk, the smaller within the larger, as described.

3d, The garbage box with one of its sides constructed so as to form a part of the curb of the sidewalk, so that the box may be set as close as possible to the carriage-way for convenience of throwing its contents into a cart.

4th, The combination of the garbage box with a drain grating extending up to or near its top, so that the liquid matter may drain from the surface of the garbage, wherever that may be, as described.

5th, The combination in a garbage box of the following parts, viz., the body of the box, the top constructed with a door to form part of the sidewalk of the street, and one side constructed to form part of the curb of the street, as described.

55,921.—GANG PLOW.—Joseph D. Smith, Peoria, Ill.:

I claim, 1st, Arranging the gang of plows between the forward and the rear points of support of the carriage frame, to which said plows are attached when they are free to rise or fall independently of each other, substantially as described.

2d, Pivoting the forward ends of the plow-beams, D, D, to the carriage frame, by means of rods, b, b, which are adjustable at their outer ends in slots, c, c, for the purpose of leveling the plows, substantially as described.

3d, The combination of the vibrating plow-beams, D, which are pivoted to a carriage frame at a point which is in front of the transporting wheels, with a device which will admit of the forward part of said frame being elevated or depressed at pleasure, substantially as described.

4th, In combination with plows which are arranged in advance of the axle-tree, B, and pivoted so as to be capable of rising or falling, I claim the gravitating catches, d, d, or their equivalents, substantially as described.

5th, The arrangement of levers, F, E, vibrating plows, D, D, and catches, d, d, substantially as described.

6th, Providing for adjusting the forward end of the carriage frame, for regulating the pitch of the plows, by means of draught-pole, G, lever, H, substantially as described.

7th, Connecting the rear end of the pole, G, to the axle, B, by means of a pin, e, and a laterally adjustable plate, f, substantially as described.

8th, The adjustable draught-rod, K, arranged and applied to the plow carriage so as to operate substantially as described.

9th, The combination of a pole, G, which is adjustable at its rear end, with a draught-rod, K, which is adjustable at its front end, substantially as described.

55,922.—TOP-SAIL REEFING RIG.—Wm. G. Smith and Daniel Hooper, New York City:

We claim, 1st, In connection with a single top-sail, a flowing middle yard or reefing-boom, D, checking-line, g, g, bifurcated lifts, M, m, m, and preventer lifts, K, all arranged and operating as herein shown and explained.

2d, The combination of the binding-rope, f, f, and loops formed by stops, e, e, for securing the belly of a top-sail to a broom, D, or middle yard, substantially in the manner and for the purpose specified.

55,923.—LACING FOR BOOTS AND SHOES.—Leonard A. Sprague, New York City:

I claim, 1st, The lacing-eyelet in which the lacing-eye is formed in one piece with the fastening device, substantially as herein shown and described.

2d, I claim the combination of two or more lacing-eyes with intermediate links, when the same are formed of one piece of wire, substantially as herein shown and described.

3d, The method of fastening lacing-eyelets, substantially as described, by confining the shanks or links thereof in the folds or between two thicknesses of leather or other material, to which the lacing is attached.

55,924.—BOOK-HOLDER.—David J. Stagg, New York City:

I claim the arms, C, C, secured in the cleat or strip, B, by screws, b, b, and provided with pivoted fingers, D, at their outer ends in connection with the inclined frame or base, all arranged substantially as and for the purpose specified.

55,925.—STAND, DESK, AND BOOK-HOLDER.—David J. Stagg, New York City:

I claim the stand, writing-desk and book-holder consisting of the bed-piece, D, hinged-frame, E, hinged-board, F, provided with the fingered arms, G, G, and hinged-bar, I, combined and operating in the manner and for the purpose herein specified.

55,926.—PORTABLE FENCE.—Jno. K. Staman, Mifflin, Ohio:

I claim the braces, d, d', and counter-brace, d'', in combination with the posts, B, and cross-rails, e, e', when constructed and arranged in the manner and for the purpose set forth.

55,927.—NEEDLE FOR SEWING MACHINES.—Monroe Staimarl, New Britain, Conn.:

I claim the employment of the needle as described, in combination with a shuttle or its mechanical equivalent, substantially as and for the purpose described.

2d, As a new article of manufacture, I claim an eye-pointed sewing-machine needle, a, eccentric with reference to its shank, c, substantially as and for the purpose described.

55,928.—WASHING MACHINE.—Henry H. Staples, Woburn, Mass.:

I claim the arrangement and combination of the bar or lever, D, its handle or handles, d, d, and the standards and roller, c, with the rubber, the tub, and the series of rollers disposed in such tub, the whole being substantially as specified.

55,929.—MEANS FOR FISH TO PASS OVER DAMS.—Daniel Steck, Hughesville, Pa:

I claim an improved device for facilitating the passage of fish over dams, formed by combining a series of inclined planes, E, I, J, K, L, with each other, with the partition walls, G. O. P, R, with the side walls, F, N, and with the end walls, T and S, the whole being constructed and arranged in connection with the end of the dam and with the bank of the stream, substantially as described and for the purpose set forth.

55,930.—HORSE RAKE.—Henry Stimmel, Canton, Ohio:

I claim the combination of the peculiarly shaped iron, "G," having a slot, "K," therein, with the screw, "H," in connection with the lever, "F," substantially in the manner and for the purpose specified.

55,931.—STOP-COCK.—Herman Strater, Jr., Roxbury, Mass.:

I claim in a stop-cock providing its plug with elastic yielding filling, substantially as and for the purpose described.

55,932.—WRENCH.—George C. Taft, Worcester, Mass.:

I claim the arrangement of the nut, I, in combination with the handle, G, tang, A, and ferrule, H, with its shoulder, b, and step, J, constructed and operating in the manner and for the purpose herein described.

55,933.—BUCKLE.—D. S. Thompson, West Haven, Conn.:

I claim the combination of the frame, A, with the tongue, B, and bar, C, when the tongue and bar are hinged to the rear bar of the frame, the whole constructed and arranged to operate substantially in the manner herein set forth.

55,934.—CHURN.—W. H. Tillou and S. Shumway, Le Roy, N. Y.:

We claim the gear or cog-wheel, D, constructed with curved cogs or flanges on the side of its rim, substantially as herein described, in combination with the cog-wheel, C, of the dasher-handle, B, for the purpose of frequently reversing the motion of the dasher, A.

55,935.—CARPET-STRETCHER.—E. W. Twing, Springfield, Mass.:

I claim, 1st, The coupling consisting of the slides, D, E, pivot, b, socket, c, and set-screw, a, or its equivalent, in combination with the shafts, A, B, of a carpet-stretcher, substantially as specified.

2d, The rounded head, C, in combination with the levers, A, B, and slides, D, E, arranged and operating in the manner and for the purpose herein specified.

55,936.—BROOM-HEAD.—James Wasson, Fairwater, Wis.:

I claim, 1st, An improved broom-head, formed by combining with each other and with the socket, A, the two parts or halves, B and C, constructed substantially as herein described and for the purposes set forth, said halves being held together at the lower part of their side edges by the barbed spike-hooks, F.

2d, The combination of the two perforated or roughened plates, D and E, constructed as described, with the parts or halves, B and C, substantially as and for the purpose set forth.

3d, The combination of the barbed spikes, F, with the halves or parts, B and C, substantially as described and for the purpose set forth.

55,937.—TOBACCO-PRESS.—W. H. Watson, Yonkers, N. Y.:

I claim, 1st, The inner or secondary box, constructed and operating, substantially as described, for the purposes set forth.

2d, In combination with the same, I claim the outer box top-plate and clamps, when the same shall be constructed, combined, and operated substantially as shown.

55,938.—APPARATUS FOR OILING JOURNALS.—James E. Weaver, Temperanceville, Va.:

I claim the combination of the vessel, c, and pipes, d and e, with a "plumber-block," or bearing of shafting, as herein described and for the purpose set forth.

55,939.—STOVE-PIPE DRUM.—Harvey G. Whittaker, Brattleboro', Vt.:

I claim the combination of the internal drum, B, intermediate drum, A, and external drum, C, with the pipes, D, E, F, G, when the parts are constructed and arranged in the manner and for the purposes herein described.

55,940.—SASH-SUPPORTER.—Martin V. B. White, Troy, N. Y.:

I claim the employment of the arm-piece or rod, c, having the thumb-piece, I, thereon and the opposite end thereof so constructed as to receive the roller, D, and operate the same within the triangular recess, E, each being arranged and combined in the manner substantially as herein described and set forth.

55,941.—MEASURING-FUNNEL.—A. H. Whitney, Portland, Me.:

I claim the combination in a funnel of the graduated scale, the stop-cock, the flange and air vent, all as and for the purposes specified.

55,942.—HARNESS-HOOK.—J. J. Wilkins, Virdeu, Ill.:

I claim the hook, A, provided with the transverse opening or hole, n, and the horizontally projecting ears, a, constructed and operating as shown and described.

55,943.—RAILROAD SWITCH.—John A. Williamson, Lafayette, Ind.:

I claim the combination of the bridge, A, tapered guide, B, and tapered bar, C, when the latter is securely pivoted to the guide, B, and all constructed and arranged in the manner and for the purpose herein specified.

55,944.—DIE FOR CUPPING OR RAISING ARTICLES OF METAL.—Samuel R. Wilmot, Bridgeport, Conn.:

I claim the attachment of the blank-holder, B, directly to the bed-plate or fixed die, A, substantially as herein set forth for the purpose specified.

55,945.—BORING MACHINE.—Benjamin T. Young, Charlestown, Mass.:

I claim a grooved cam constructed with inclined sides, in combination with a cone-traveler.

55,946.—WEIGHING-CAR.—Joshua H. Zinn, Kingston, Tenn.:

I claim, 1st, The arrangement of the levers or frame, B and C, within the bottom portion of the frame of a car and connected together, and with any suitable weighing-lever or beam in combination with the inside box or casing resting at each end upon such frames, B and C, substantially as described and for the purpose specified.

2d, The shaft, P, having cam-shaped disks, R, so arranged as to lift the inside box from the weighing-levers or frames, for the purpose set forth.

55,947.—MACHINE FOR HULLING COFFEE.—Robert Anderson, Brooklyn, N. Y., assignor to S. O. Ryder, New York City:

I claim the combination in a machine for hulling and polishing coffee of an obliquely ribbed wheel, E, rotating within a slightly conical toothed concave, A, constructed as described, and a series of wings, G, rotating within a horizontal tapering or conical case, A, the whole arranged to operate substantially as herein set forth for the purpose specified.

55,948.—BROOM-HEAD.—J. D. M. Armbrust, assignor to himself and Jacob Freetly, Apolloborough, Pa.

I claim the metallic band composed of thin metal and furnished with slots, in combination with the strengthening pieces and bolts and nuts as and for the purpose described; also the combination of the movable cap piece and the handle slotted at its lower end, for the passage of the bolts constructed as described, and for the purposes set forth.

55,949.—APPARATUS FOR CARBURETING AIR.—Franklin H. Brown, assignor to himself and James F. Griffin, Chicago, Ill.:

I claim, 1st, The combination of a series of revolving buckets, F, and a hollow stationary shaft, G, provided with the openings, a and b, arranged and operating substantially as and for the purposes specified.

2d, The combination of a series of revolving buckets, F, and a stationary hollow shaft, G, when provided with the partition, m, and the openings, a and b and c and d, arranged and operating as and for the purposes shown and described.

3d, In combination with a carbureter, A, arranged above the burners, I claim the employment of a device for compressing and forcing air into the same, substantially as and for the purposes herein specified and shown.

4th, The employment of an automatically closing valve, V, in combination with a close carbureter, arranged above the burners and a device for compressing and forcing air into the carbureter, and a weight or its equivalent, for operating the same, substantially in the manner and for the purposes specified.

55,950.—APPARATUS FOR CARBURETING AIR.—Franklin H. Brown, assignor to himself and Jas. F. Griffin, Chicago, Ill.:

I claim, 1st, The combination in one device of two or more siphons, arranged and operating substantially as and for the purposes specified and shown.

2d, The arrangement of the pans of a carbureter in two or more independent sets, in combination with devices for drawing off the contents of said sets separately, and of the pans in each set simultaneously, substantially as specified and shown.

3d, The arrangement of a deflector, V, with the inlet tube, N, substantially as and for the purposes described.

4th, Providing the inlet tube, N, with a cap, P, arranged as shown and for the purposes set forth.

5th, The combination and arrangement of the deflector, V, and cap, P, with the inlet-pipe, N, substantially as specified and shown.

55,951.—COMPOSITION OF MATTER.—Lewis Francis, assignor to himself and Cyrus H. Loutrel, New York City:

I claim combining glue, glycerine, and silicates, with or without saccharine matter, to form a new and useful composition of matter for various purposes.

55,952.—GRAIN SEPARATOR.—John Green, assignor to himself and James W. Barker, Norwalk, Ohio:

I claim, 1st, The two fans, c, c', in combination with the two shoes, F, F', operated by means of the gearing, connecting-rods, and levers from the driving-shaft of the machine, substantially as and for the purpose herein set forth.

2d, The double inclined ends of the upper screens, i, of the shoes, F, F', in combination with the side openings, m, in the shoe-boxes, substantially as and for the purpose set forth.

55,953.—FASTENING FOR FRUIT CANS.—George H. Hammer, Newville, Pa., assignor to himself, D. J. Brougher and Wm. A. Middleton, Harrisburg, Pa.:

I claim securing the cover, a, by means of the bail, B, attached to ears, e, or lugs, c, substantially as shown and described.

55,954.—BUTT HINGE.—James C. Hyde, assignor to D. S. Thompson, West Haven, Conn.:

I claim a hinge, the two parts of which are formed and united, substantially in the manner herein set forth.

55,955.—METALLIC SEAL ENVELOPE.—Ralph S. Jennings, assignor to himself and Norman G. Kellogg, New York City:

I claim, 1st, The metallic seal applied to envelopes in their manufacture, substantially as and for the purpose described.

2d, The new article of manufacture herein described and shown, to wit, an envelope for letters furnished with a metallic seal, which envelope is ready for being sealed when on sale, as set forth.

55,956.—CLOTHES-SPRINKLER.—John L. Kendall, assignor to himself, R. H. Trested, and Lewis Hurst, New York City:

I claim a clothes-sprinkler, composed of a conical vessel, A, handle, B, neck, C, and nipple, D, as a new article of manufacture.

55,957.—FIRE-ALARM.—C. D. Kubach, assignor to himself and W. W. Clay, Philadelphia, Pa.:

I claim the casing, E, with its piston, G, pin, w, and spring, t, in combination with the slotted plate, F, and the within-described alarm mechanism, or its equivalent, the whole being constructed and operating substantially as and for the purpose described.

55,958.—MODE OF SETTING STATIONARY STEAM BOILERS.—Caleb S. Nelson, West Troy, N. Y., assignor to himself and Henry I. Seymour, Troy, N. Y.:

I claim, 1st, The annular chamber or surrounding chamber, a, formed between the stationary boiler, B, and steam-dome, C, and the inner part or surface of the brick or mason work, A, in

© 1866 SCIENTIFIC AMERICAN, INC.

the manner and for the purpose substantially as herein described and set forth.

2d, The suspending of the stationary steam boiler, B, within the brick arch or mason work, A, surrounding the same so as to form an air-chamber, a, immediately upon and over the upper surface of such steam boiler so as to prevent the escape of heat, in the manner and for the purposes substantially as herein described and set forth.

55,959.—PICKER-ARM FOR LOOMS.—George W. Paterson, assignor to himself and H. M. Payne, Newburyport, Mass.:

I claim, 1st, The picker-arm, constructed and arranged for operation substantially as herein shown and described.

2d, In a picker-arm, I claim the combination of a friction-roller with a shell inclosing the same on top and sides, as herein described.

3d, In a picker-arm and in combination with an inclosing shell, as herein described, I claim the friction-roller when of an ovoidal or equivalent shape, and having its bearings in the shell, as herein shown and set forth.

55,960.—CHURN AND ICE-CREAM FREEZER.—Thomas W. Pomeroy, assignor to himself and Wm. J. Layman, East Hampton, Mass.:

I claim the combination of the cylinder, C, with the case, A, and rotary dasher, E, when the cylinder, C, is secured within the case, A, by means of horizontal arms, b, projecting from C, and fitted between guides or lips, a, attached to the inner surface of A, and either with or without the feet, c, to rest on the bottom of A, substantially as and for the purpose specified.

55,961.—MOP-HEAD.—Louis C. Rodier, Springfield, Mass., assignor to himself and Henry Hammond. Ante-dated Dec. 26, 1865:

I claim the jaws, B and C, having fingers or teeth, for the purpose herein specified, when combined with the handle and ring, d, in such manner as to form a floor mop, the whole being arranged substantially as herein described.

55,962.—LIQUID-COOLER.—Joseph R. B. Schwarze, assignor to himself and Daniel Pfeil, Washington, D. C.:

I claim the chamber, C, provided with a pipe, B, and arranged for attachment to the faucet by the coupling, E, as described and represented.

55,963.—PLATFORM SCALE.—F. M. Strong and Thomas Ross, assignors to Joan Howe, Jr., Brandon, Vt.:

We claim, 1st, The combination of the levers, C, C, and the links, k, k, with their upper and lower bearings, m, i, and the secondary lever, D.

2d, The shaft, F, in combination with the adjustable arms, E, E', as and for the purpose described.

3d, The combination of the poise, s, lever, P, x, graduated plate, u, and movable stop-pieces, w, as and for the purpose described.

55,964.—CAR-BRAKE.—James Temple, assignor to himself, John Schock, and H. E. Miller, Selinsgrove, Pa.:

I claim the combination of the rock-shafts, D, arms, f, f, and rods, a, with the arms, e, and rubbers, E, operated by the levers, h, and arranged as described for the purpose set forth.

55,965.—NUT TAPPING MACHINE.—Frederick Votteler, assignor to Jacob W. Holenshade, Cincinnati, Ohio:

I claim, 1st, The combination in a tapping machine of taps for right and left-hand nuts, arranged and operating substantially as described.

2d, The combination of two or more taps with a mechanism for adjusting simultaneously a nut to each, arranged and operating substantially as described.

55,966.—PENCIL-CASE.—D. T. Warren, assignor to himself and Amedee Spadone, New York City:

I claim the arrangement of the lead-holder, a, shaft, b, tube, c, straight slot, d, stud or pin, h, loose sleeve, m, with its enlargement, o, spiral slot, l, tube, r, pen-holder, t, tube, v, straight slot, w, pin, x, spiral slot, y, and loose sleeve, z, as and for the purpose set forth.

55,967.—WATER-CLOSET.—Darius Wellington, assignor to Cornelius Wellington, Boston, Mass.:

I claim, 1st, The arrangement of the shaft, d, slotted plate, f, arm, i, and rod, k, for supporting the pan by the connection between it and the operating rod, substantially as described.

Also, combining with the supply-pipe and pan the flexible air-ball or chamber, operating to seal the pan, substantially as set forth.

Also, in combination with the hopper, a, the divided nozzle and plate, o, operating as and for the purpose described.

Also, the combination of the ring (serving as an elastic packing) with the flange, p, and stand, b, substantially as described.

Also, connecting the supply-pipe to the hopper by means of the flanged coupling, t, the nut or screw in the supply-pipe, and the interposed packing, u, arranged and operating substantially as shown and described.

55,968.—KNITTING MACHINE.—H. L. Williams, assignor to The National Knitting Machine Company, Seneca Falls, N. Y.:

I claim, 1st, The combination of the cogs, k, k, with the lags constituting the "form" and with the gear-wheel by which they are driven, substantially as specified.

2d, The combination of the curved guide, G, with the form, B, and gear-wheel, C, substantially as described.

55,969.—MANUFACTURE OF ARTIFICIAL STONE.—William Kirrage, London, England:

I claim, 1st, The manufacture of artificial stone, bricks, and tiles, or other hard material, by mixing and using the sulphate of iron or other similar metallic sulphates, or other similar mixtures of acids with metallic bases, and the several materials herein-before described, in combination with cements and silica, and limes and silica, contained in the materials such as I have mentioned for the purposes herein-before described,

2d, The application of the coloring matters before named in combination with the silica and other materials.

3d, In the manufacture of bricks and tiles from plastic materials, the application of the materials specified for the purpose of effecting a more perfect combustion, burning, and hardening, thus producing a superior form of article.

55,970.—PETROLEUM TANK.—Paul Jacovenco, Buchareat, Wallachia:

I claim the herein-described apparatus for preserving or storing petroleum and other oils, the same consisting of two concentric cylinders, the space between them being divided by a transverse partition, and communicating with the interior cylinder by means of apertures, as described, in combination with pipes arranged for operation as and for the purpose set forth.

55,971.—HOT-AIR ENGINE.—William Reintein, Barcelona, Spain:

I claim, 1st, The arrangement of the support of an air engine so that the axis of the motor cylinder shall be vertical, in the manner and for the purposes set forth.

2d, The combination and arrangement of a tubular boiler in the place of the dome which serves as a furnace in the Ericsson machine, as and for the purposes described.

55,972.—CORSET.—E. Hambujer, Detroit, Mich.:

I claim, 1st, A corset made substantially as herein-described, with a continuous or connected back, forming a lap or gore when the lacings are drawn to tighten the garment around the person

2d, In combination therewith I claim the skirt supporting hooks, H, H, arranged substantially as described.

RE-ISSUES.

2,292.—LIQUID-COOLER.—Adalbert Fischer, New York City. Patented May 15, 1866:

I claim the movable heads, E, with annular recesses, a, in combination with one or more bolts, F, annular cylinder, A, and vessel, b, all constructed and operating substantially as and for the purpose described.

2,293.—STRAW-CUTTER.—Warren Gale, Chicopee Falls, Mass. Patented March 7, 1854:

I claim, 1st, The fixed pivot, F, on which the moving-knife works, provided with a flanch for fastening to the cutter-box, and made adjustable thereon by means of slots and bolts, or their equilents, substantially as and for the purpose herein specified.

I also claim the arrangement of the adjustable gauge-plate, G, in front of the fixed knife in such a manner that it shall be raised above the said fixed knife in proportion to the increased distance at which it is adjusted away from the knife, to give a longer cut and *vice versa*, substantially as herein set forth.

2,294.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861:

I claim, 1st, The pulleys at or near the lower end of the inner reel support, for the purpose specified.

I also claim the single endless belt or chain passing from the driving-pulley, g, on the main frame, to and over intermediate pulleys placed to one side of a vertical plane passing through said driving-pulley, and thence to and over the pulley on the inner end of the reel-shaft, substantially as and for the purpose described.

2,295.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861:

I claim the bent levers, s, pivoted at the heel of the shoe, and extending to a point between the driving wheels, and thence connected to a lever near the driver's seat or stand, for the purpose of raising the outer end of the finger beam, substantially as described.

2,296.—HARVESTER.—William K. Miller, Canton, Ohio. Patented July 2, 1861:

I claim the brace on the grain side of the machine extending from the front end of the frame to the axle of the driving wheel as a support for the finger-beam and the reel-post, substantially as described.

2,297.—METHOD OF WARMING AND VENTILATING BUILDINGS.—E. Y. Robbins, Cincinnati, Ohio. Patented May 6, 1862:

I claim, 1st, The arrangement of the hot-air chamber or reservoir of heat for warming the floor and lower part of the walls, in connection with the arrangement for the introduction at the bottom of the room of moderately warmed fresh air, which has not been in contact with the hot metallic surface either of hot-water pipes or steam pipes, or of a stove or furnace, or any other highly-heated surface, substantially as above set forth.

2d, The fresh-air chamber, F, Fig. 1, under the hot-air chamber, C, Fig. 1, and under the reservoir of heat formed by the pipes, mortar, etc., of the radiator, W, Fig. 6, all substantially as set forth.

3d, In case of warming the upper rooms by the waste heat of the fire in the lower story, I claim the arrangement of an inner smoke-flue within the brick flue or chimney, E, Fig. 3, and the diaphragm, F, Fig. 5, for turning the current of hot-air rising between this inner smoke-flue and the sides of the chimney inwards under the floor of the upper room for warming it, or any equivalent device, substantially as set forth.

4th, In using hot-air pipes for warming cars or rooms, I claim the making of said pipes in their different parts of different materials and of different shapes, so that their conducting and radiating power shall increase as the distance from the furnace or source of heat increases and as the temperature of the air within them decreases, so that they shall distribute the heat as nearly uniform as possible throughout their entire length, substantially as above set forth.

5th, The horizontal radiator, W, Fig. 6, formed of tiles, mortar, cement, or other similar material (which has acquired, or will acquire, a sufficient degree of hardness), placed in and forming a part of the floor, in combination with the arrangement for heating it by hot-water pipes or steam pipes, placed under the tiles or other material of which said radiator may be formed.

2,298.—WATER-PROOF GAITER SHOE AND BOOT.—The Goodyear Metallic Rubber Shoe Company, Naugatuck, Conn., assignees of Thomas C. Wales, Dorchester, Mass. Patented February 2, 1858:

We claim a new or improved manufacture, or water-proof vulcanized rubber and cloth gaiter shoe, made in manner and with its external layer of cloth and its lining of cloth arranged together and with respect to the remainder or rubber parts or foxing, substantially as specified.

DESIGNS.

2,340.—ENVELOPE.—Samuel Rayner, New York City.

2,341.—TRADE-MARK.—Levi Sohl, A. J. Sohl, and David Gibson, Indianapolis, Ind.

NEW RATES OF ADVERTISING:

FORTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, except on payment of one dollar a line each insertion, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

FOUNDERY AND MACHINE SHOP FOR SALE. In Good Running Order, with good, durable water power. For particulars, address Post-office box 346, Jamestown, New York. 2

INVENTORS WISHING TO SELL GOOD PATENT RIGHTS, Should send for the Circular of the Western Massachusetts Patent Agency, addressing J. B. GARDINER, Fort Block, Springfield, Mass. 1*]

WANTED.—A GOOD SECOND-HAND ENGINE AND BOILER. Address, with price and description, C. W. PIERCE & CO., Excelsior Foundery, 49 Liberty street, Albany, N. Y. 1*]

CAMDEN TUBE WORKS (OFFICE AND Manufactory Second and Stevens streets, Camden, N. J.,) Manufacturers of Wrought Iron Welded Tube of all sizes; Peace's Improved Gas Pipe Screwing Machines for both Hand and Power; Pipe Vises, Stocks, Dies, Taps, Reamers, Tongs, and all other tools used by Steam and Gas Fitters. Also, Upright Drill Presses for both Hand and Power, constantly on hand, and ready for delivery. 24

DRILL CHUCKS. OLMSTED'S PATENT, Self-centering and Tightening, made from the best Cast Steel, and every piece is hardened. It is the smallest and most substantial Chuck in the market. We make two sizes. No. 1 will open ⅜-in.; No. 2 3-16-in. Outside diameter, No. 1, 1 and 7-16-in.; No. 2, ⅝-in. Either Chuck will hold the finest wire. Larger drills can be used than the size to which the Chuck opens. The ⅜ Chuck will drive a 1-inch Drill, no wrench is used. Will be forwarded to any address on receipt of price.
Price:—No. 1, $7; No. 2, $5.50.
Illustrated in the Scientific American.
L. H. OLMSTED, Stamford, Conn.

DRILL CHUCKS.—The Trade, generally, are supplied with OLMSTED'S PATENT DRILL CHUCKS. 2

RICHARDSON'S PATENT RATCHET WRENCH, Illustrated on Page 248, Vol. X. (New Series). State Rights for sale. Address J. T. MIDDLETON, P. O. Box 704, New London, Conn. 1*]

BULLARD & PARSONS, HARTFORD, CONN., are prepared to furnish Shafting of any size and length, in large or small quantities. Our hangers are adjustable in every point, and fitted with Patent Self-oiling Boxes, guaranteed to run six months without re-oiling, and save 80 per cent of oil. By making a speciality of shafting, we are able to furnish very superior work at reasonable rates. Heavy work built to order. 2 tf

LABORATORY OF INDUSTRIAL CHEMISTRY.—Professor H. Dussauce, Chemist, for the next six months, can be addressed 13 Avenue Bugeaurd, Paris, Seine, France. 1*

FABRICATION OF VINEGAR.—Prof. H. Dussauce, Chemist, is ready to furnish the most recent French processes to manufacture Vinegar by the quick method, with and without alcohol, directly from grain, etc. For further information address 13 Avenue Bugeaurd, Paris, France. 2 3*

TO SOAP MANUFACTURERS.—WHILE IN Europe, Prof. H. Dussauce, Chemist, is ready to furnish plans of Factories and drawings of Apparatus, with the French processes to manufacture the white and marbled soap, family, soft, silicated, transparent, and fancy soaps. Recipes to prepare every kind of lye. For further information address 13 Avenue Bugeaurd, Paris, France. 2 3*

SPIRAL SPRINGS.—FOR $1 I WILL SEND Directions for Making Pressure Spiral Springs out of Iron Wire that is more durable than Steel. Address Box 1394, Meadville, Pa. 2 3*]

BIND YOUR OWN MUSIC, NEWSPAPERS, etc. Use ADHESIVE BINDING TAGS (Heyl's Patent). Circulars and samples, etc., sent gratis. Address, inclosing stamp, H. R. HEYL & CO., 113 South 4th street, Philadelphia, Pa. 2 4*]

WANTED.— $200 PER MONTH Paid to Agents to introduce our New $15, $18, and $20 Sewing Machines, Ketchum's Patent. Address, with stamp, MONADNOCK SEWING MACHINE CO., Winchendon, Mass. 26 13]

TWIST DRILLS (ALL SIZES) FOR STUBBS'S Wire and Machinist's use, on hand for sale by LEACH BROTHERS, 102 Liberty street, New York. 25 13]

INCRUSTATIONS PREVENTED by WINANS' Incrustation Powder. Cost $3 to $5. 11 Wall-st., N. Y. 26 5*

HOW TO PREVENT BOILERS AND STEAM Pipes from Rusting. Use Temple's Liquid a few days before stopping. Address A. TEMPLE, Bridgeport, Conn. 26 4*

$10,000 WORTH OF PUMPS, HYdraulic Rams, etc., of every description. Best makers in store, and will be sold at a large discount, by J. B. FULLER, No. 8 Dey street, New York. 25 4]

CHARLES A. SEELY, CONSULTING AND Analytical Chemist, No. 26 Pine street, New York. Assays and Analyses of all kinds. Advice, Instruction, Reports, etc., on the useful arts. 22

CLEMENS'S CIRCULAR SAW MILL.—Manufacturers or parties wishing to engage in the Manufacture of the best Saw Mill ever invented and put in practical operation, can obtain a license to build the same, with complete working drawings, upon application to the inventor. G. H. CLEMENS, Post-office box 2,442, Cincinnati, Ohio. 26 4*]

REYNOLDS'S TURBINE WATER WHEELS! REYNOLDS'S PATENT SWEEPS THE FIELD! New Improvements; Low Prices; Does not Clog; Has no Complications of Gates or Costly Flume Works; Compact for Shipment; Great Water Saver. THE ONLY WHEEL THAT EXCELS OVERSHOTS! Gold Medal awarded by American Institute for Superiority. Agents wanted in every county. GEORGE TALCOT, Late TALCOT & UNDERHILL, No. 96 Liberty street, N. Y. 21 13*]

WHEELER & WILSON, 625 BROADWAY, N. Y.—Lock-stitch Sewing Machine and Buttonhole do. 1tf

WIND MILLS (SELF-REGULATING), FOR Pumping, Grinding Grain, and other purposes, from one to thirty horse-power. Also, ORVIS'S AMERICAN FARM MILL for Grinding, manufactured by the EMPIRE WINDMILL MANUFACTURING COMPANY, Syracuse, N. Y. 21 8]

M. BAILEY & CO., PROVISION BROKERS, No. 40 West Fourth street, Cincinnati. Orders for Provisions, Lard, Tallow, Grease, Oils, etc., carefully and promptly filled. 1 33*

STEAM ENGINES WITH LINK MOTION, Variable Automatic Cut-off, of the most approved construction; Mill Gearing, Shafting, Hanger, etc. Address M. & T. SAULT, New Haven, Conn. 7 26*]

MACHINERY AND MACHINISTS' TOOLS, all kinds, including the LEONARD & CLARK PREMIUM LATHE. Also, Steam Engines, Saw Mills, Wood Cutting Machinery, etc., etc. Steamboat and Machinery Repairing at the QUASSAICK MACHINE SHOP, Newburgh, N. Y. 26 3*]

VOSSMARK & MEISSNER, CONSULTING and Mechanical Engineers and Brokers of Machinery, furnish Calculations, Estimates, General Working and Patent Drawings. Particular attention paid to the practical development of new inventions. [26 4*] 5 Tryon Row, Room 2.

© 1866 SCIENTIFIC AMERICAN, INC.

PRESSURE BLOWERS.

PRESSURE BLOWERS—FOR CUPOLA FURNACES, Forges, and all kinds of Iron Works. The blast from this blower is four times as strong as that of ordinary fan blowers, and fully equal in strength to piston blowers, when applied to furnaces for melting iron. They make no noise and possess very great durability, and are made to run more economically than any other blowing machine. Every blower warranted to give entire satisfaction. Ten sizes, the largest being sufficient to melt sixteen tuns of pig iron in two hours. Price varying from $40 to $345.

FAN BLOWERS, from No. 1 to No. 45, for Steamships, Iron Mills, Ventilation, etc., manufactured by B. F. STURTEVANT,
1 tf] No. 72 Sudbury street, Boston, Mass.

ANDREWS'S PATENT OSCILLATING ENGINES.—Double and Single Engines, from 1-2 to 125-horse power, finished at short notice. These engines leave the shop ready for use; require no special foundation; are compact, light and simple, and economical of power. For descriptive pamphlets and price list address the manufacturers,
W. D. ANDREWS & BRO.,
1 tf] No. 414 Water street, N. Y.

TOWER'S
ALCOHOL PROCESS OF TANNING.
Patented Dec., 1865; requires but one-third the time necessary by any other process. It will tan the heaviest hides in less than two months.

It will make better leather and more of it. Calfskins tanned by it will average a quarter of a pound more weight than can be obtained by any known process. The leather is better. Every one knows the preservative effect of alcohol upon all animal matter.

It is applicable either to limed or sweated skins or hides. From sweated skins can be made upper leather as pliable and sole leather as easily sewed, as any tanned leather in the market.

No complicated or expensive machinery is needed. Any tannery may be adapted to the use of this process, for less than one hundred dollars.

Specimens of the leather and the operation of the process may be seen, and any further particulars obtained, at the office, No. 30 Hanover street, Boston
21 13* L. FREDERICK RICE, Agent.

STEAM GAGES—BATES'S PATENT—GOVERNMENT AND CITY STANDARDS.
The cheapest and best steam gages ever offered in this market. Also water Gages, Marine Clocks, Registers, Etc. Model making and repairing promptly attended to. Call and Examine, or send for circular before purchasing elsewhere.
KEEN BROTHERS, No. 218 Fulton st.
REFERENCES.—Messrs. Hopper and Douglas, U. S. Inspectors; Capt. Lord, M. P. Inspector; Messrs. Todd and Rafferty, No. 4 Dey street; New York S. E. Works, Twenty-third street, E. R.; Wash. I. Works, Newburg. 20 8*

PORTABLE STEAM ENGINES, COMBINING
The maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & Co., Lawrence, Mass. 1 tf

OIL! OIL!! OIL!!!
For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine Signal, and Car Oils, indorsed and recommended by the highest authority in the United States and Europe. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American", after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No 61 and 63 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the world. 1tf

J. A. FAY & CO.,
CINCINNATI, OHIO,
Patentees and Manufacturers of all kinds of
PATENT WOOD-WORKING MACHINERY,
of the latest and most approved description
Particularly designed for
Navy Yards, Sash, Blind and Door,
Ship Yards, Wheel, Felly and Spoke,
Railroad, Stave and Barrel,
Car and Shingle and Lath,
Agricultural Shops, Planing and Resawing
Mills, Etc.
Warranted superior to any in use. Send for Circulars.
For further particulars address J. A. FAY & Co.,
Corner John and Front streets,
Cincinnati, Ohio,
Who are the only manufacturers of J. A. Fay & Co.'s Patent Wood-working Machinery in the United States. 4 1y

THE VALUABLE MILLING PROPERTY IN the City of Richmond, at the corner of Arch and Eighth streets, known as the
"FRANKLIN PAPER MILLS,"
for Lease or Sale.

At the request of the owners, we offer for Lease for a long term of years, the above valuable property, the buildings of which were destroyed by fire April 3, 1865. The lot contains an half acre, and is supplied with water from the basin of the James River and Kanawha Company, at an annual rent of three hundred dollars. It has ample water power, which can be applied at three different points, and is never affected by freshets in the river. The property is also supplied with pure Spring Water, conveyed to it through iron pipes. The stone and brick walls are still standing, and contain a large quantity of valuable materials suitable for rebuilding. The site is admirably adapted for a first-class paper mill or flouring mill, or other manufacturing purpose, and being in the heart of the city, is believed to be the most valuable mill-site on the market, for the reason that the water rent is cheap and the power superior. For thirty years before its destruction by fire, it was successfully worked as a first-class paper mill. Should a Purchase of the property be desirable, by an incorporated Company, or an association of Capatalists, the owners would be willing to take Stock therein to the amount of the purchase money.

Terms accommodating, and made known on application to
HARRISON, GODDIN & APPERSON.

P. S.—Northern Capatalists, wishing any further information in regard to this truly valuable property, are referred to Messrs. Harrison, Garth, & Co., No. 18 New Street, N. Y. [26 2*] H. G. A.

R. BALL & CO.,
SCHOOL STREET, WORCESTER, MASS.,
Manufacturers of Woodworth's, Daniell's, and Gray & Wood's Planers, Sash Molding, Tenoning, Mortising, Upright and Vertical Shaping, Boring Machines, Scroll Saws, and a variety of other Machines and articles for working wood.
Send for our Illustrated Catalogue. 1 51*

LENOIR PATENT GAS ENGINES,—WITHOUT fire, coal, smoke, or noise. Operated by petroleum, or coal gas. Ignited within the cylinder by the electric spark. Half-horse to four-horse power, for pumping, sawing, turning, hoisting, grinding, etc. With portable gas generators for farms and plantations. Manufactured exclusively at the
LENOIR GAS ENGINE WORKS,
26 10* 435 East Tenth street, near Avenue D, New York.

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, N. Y. 1 tf

KEEP YOUR CARRIAGES AND WAGONS properly washered, thereby saving 50 per cent of the wear, and making them run easy and still. Use the Patent Washer Cutter for cutting carriage washers, pump packing, etc.
18 10* KING & SMITH, Middletown, Conn.

THE HARRISON BOILER—A SAFE STEAM BOILER.—This new Steam Generator combines essential advantages in Absolute Safety from explosion, in first cost and cost of repairs, durability, economy of fuel, facility of cleaning, and transportation, not possessed by any other boiler.

It is formed of a combination of cast-iron hollow spheres—each 8 inches in external diameter, and ⅛ths of an inch thick, connected by curved necks. These spheres are held together by wrought iron bolts with caps at the ends. The form is the strongest known. Its strength to resist internal pressure is very great—unweakened as it is by punching or riveting, which lessens the strength of the wrought iron boiler plate about forty per cent. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It cannot be burst under any practicable steam pressure.

Under pressure which might cause rupture in ordinary boilers, every joint in this becomes a safety valve. No other steam generator possesses this property of relief under extreme pressure without injury to itself, and thus preventing disaster.

It is not affected by corrosion, which soon destroys the wrought iron boiler. Most explosions occur from this cause. It has economy in fuel equal to the best boilers, arising from the large extent and nearness to the fire of its heating surface, as also from the wave line of this surface which, thoroughly mixing the gases, induces better combustion, and breaking the flame, causes the heat to be more effectually absorbed than in the ordinary tubular or cylinder boiler.

It gets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.

It is easily transported, and may be taken apart so that no piece need weigh more than eighty pounds. In difficult places of access, the largest boiler may be put through an opening one foot square. It is readily cleaned inside and out. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under full pressure once a week. It requires no special skill in its management. Injured parts can be renewed with great facility, as they are uniform in shape and size. When renewed the entire boiler remains as good as new. The greater part of the boiler will never need renewal unless unfairly used.

A boiler can be increased to any extent by simply adding to its width, and being the multiplication of a single form, its strength remains the same for all sizes. It has less weight, and takes less than one-half the ground area of the ordinary cylinder boiler, without being increased in hight.

Any kind of fuel may be used under this boiler, from the most expensive to refuse coal dust.

Drawings and Specifications free of charge. For descriptive circulars or price address JOSEPH HARRISON, JR.,
Harrison Boiler Works, Gray's Ferry Road,
1 6* Adjoining U. S. Arsenal, Philadelphia.

THE MOST VALUABLE MACHINE FOR Builders and Carpenters, Furniture, Carriage, Agricultural Implement, Sash and Door, Waived and Straight Molding, and Piano Manufacturers, complete for all kinds of irregular and straight work in wood, hard or soft, superior to all others, having the capacity of 20 good mechanics, called the Variety Molding and Planing Machine. We own 9 patents covering the valuable inventions for machines with upright mandrels. We hear there are parties manufacturing machines infringing on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table through which are two upright mandrels, having cutters in each head held by a screw nut; also, combination collars, saving 75 per cent in cutters, feed table to plane and cut, irons outside the cutters, preventing wood from taking undue hold. Also guards acting as plane stocks, making it safe for a boy to run.

These machines are manufactured for America and Europe, only at the Hamilton Machine Works, No. 211 East Twenty-second street, New York. All communications addressed there will receive prompt attention. Agents solicited. Send for circular giving full description. 1 3*

ANDREWS'S PATENT CENTRIFUGAL PUMPS,—Capacity from 90 to 40,000 gallons per minute.—For draining and irrigating lands, wrecking, coffer dams, condensers, cotton, wool and starch factories, paper mills, tanneries, and all places where a large and constant supply of water is required, these pumps are unequaled. They are compact, require little power, and are not liable to get out of order. For descriptive pamphlet address
1tf] W. D. ANDREWS & BRO., No. 414 Water street, N. Y.

PEQUOT MACHINE CO.,
MYSTIC RIVER, Conn.,
Manufacture the most Improved
LOOMS
FOR WEAVING TAPES, BINDINGS, WEBBING, RIBBONS, ELASTIC GOODS, AND ALL KINDS OF NARROW FABRICS.

☞ Our Looms will run faster, do more work, are less liable to get out of order than other kinds, and are warranted superior to all others in every respect. Supplies of all kinds furnished for the same. 24 8*

IMPROVED STATIONARY AND PORTABLE Steam Engines and Boilers, also Saw Mills, Cotton and Hay Presses, Corn and Flour Mills, on hand and in process of construction. Marine Engines, Iron Steamers. Light-draft River Boats, Barges, Iron Bridges, Tanks, and general iron work constructed to order. Address T. F. ROWLAND,
9 26* Continental Works, Greenpoint, Brooklyn, N. Y.

JUST PUBLISHED—THE INVENTOR'S AND MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents; Hints upon the Value of Patents; How to sell Patents: Forms for Assignments; Information upon the Rights of Inventors, Assignees and Joint Owners; Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y. 15tf

ATMOSPHERIC TRIP HAMMERS.
Persons intending to erect, or those using hammers, are invited to call and examine Hotchkiss's Patent Hammer, made by CHARLES MERRILL & SONS, No. 556 Grand street, New York. They are very simple in construction, require less power and repairs than any other hammer. The hammer moves in vertical slides; each blow is square and in the same place. For drawing or swaging they are unequaled, and many kinds of die work can be done quicker than with a drop. They are run with a belt, make but little noise, and can be used in any building without injuring the foundation or walls. The medium sizes, for working 2 to 4 inch square iron, occupy 28x56 inches floor room. Send for circular giving full particulars. 1tf

ENGINE LATHES, NEW AND SECOND-HAND, 16 to 48 inch swing, 5 to 26 feet bed, first-class tools. Scroll and Screw Chucks, all sizes, Stubbs' Twist Drills and Sockets, Stocks and Dies, Ratchets, Hammers, and all kinds of Machinists' Tools, in store, at the lowest rates, by J. B. FULLER,
25 4] No. 8 Dey street, New York.

ROCKWOOD & CO., PORTRAIT, LANDscape, and mechanical photographers, 839 Broadway, New York. This establishment received two Medals, the highest Premiums awarded at the last Fair of the American Institute, for mechanical photographs. Models, letters-patent, and drawings photographed. 19 3m

WOODWORTH PLANERS—IRON FRAMES to Plane 18 to 24 inches wide, at $120 to $150. For sale by S. C. HILLS, No. 12 Platt street, New York. a

FOR BEDSTEAD AND FURNITURE MAchinery, Friezing, Shaping and Molding Machines, address J. A. FAY & CO., Cincinnati, Ohio. 3atf

ERICSSON CALORIC ENGINES OF GREATLY IMPROVED CONSTRUCTION.—Ten years of practical working by the thousands of these engines in use, have demonstrated beyond cavil their superiority where less than ten horse-power is required. Portable and Stationary Steam Engines, Grist and Saw Mills, Cotton Gins' Air Pumps, Shafting, Pulleys, Gearing Pumps, and General Jobbing. Orders promptly filled for any kind of Machinery. JAMES A. ROBINSON, 164 Duane street, cor Hudson, New York. 10 1y

IRON CASTINGS AND STEAM BOILERS.—THE HINKLEY AND WILLIAMS WORKS, No 416 Harrison Avenue, Boston, are prepared to manufacture common and gun-metal castings, of from ten pounds to thirty tuns weight, made in green sand, dry sand or loam, as desired; Also Flue and Tubular Boilers, and "Hinkley's Patent Boiler," for locomotive or stationary engines, warranted to save a large percentage of fuel over any boiler now in use. 1 13*

CAN I OBTAIN A PATENT?—FOR ADVICE and instructions address MUNN & CO., 37 Park Row, New York, for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickley prepared. The SCIENTIFIC AMERICAN $3 a year. 30,000 Patent cases have been prepared by M. & Co.

PATTERN LETTERS AND FIGURES (METallic)—For Founderymen, Machinists, Pattern Makers, and Inventors, for lettering Patterns, etc. All sizes wholesale and retail. [20 10*] KNIGHT BROS., Seneca Falls, N. Y

PORTABLE AND STATIONARY STEAM ENGINES, 5 to 250 Horse-Power, New and Second-hand, with or without Boilers, of all kinds, ready for immediate delivery. Shafting, Belting, Pulleys, Hangers, Mill Machinery of all kinds, in store and for sale low, by J. B. FULLER,
24 4] No. 8 Dey street, New York.

FOR WOODWORTH PATENT PLANING AND MATCHING MACHINES, Patent Siding and Resawing Machine, address J. A. FAY & Co., Cincinnati, O. 31y

"POWER-LOOM WIRE CLOTHS" AND nettings, of all widths, grades, and meshes, and of the most superior quality, made by the CLINTON WIRE CLOTH COMPANY, Clinton, Mass. 1 36*

$250 A MONTH MADE WITH THE BEST STENCIL TOOLS. For samples and prices address [illegible], Payn's Block, cor. Church and Cherry sts., Burlington, Vt. 18 tf

MODELS, PATTERNS, EXPERIMENTAL and other Machinery, Models for the Patent Office, built to order by HOLSKE & KNEELAND, Nos. 528, 530, and 532 Water street, near Jefferson. Refer to SCIENTIFIC AMERICAN Office. 1 tf

MANUFACTURERS OF TEXTILE FABRICS.
DUTCHER'S PATENT TEMPLES, adapted to weaving all kinds of goods. Also
THOMPSON'S PATENT OIL CANS
for oiling Machinery; neat and economical. Furnished by
21 13 eow* E. D. & G. DRAPER, Hopedale, Mass.

UNION IRON WORKS, RHINEBECK, N. Y., Manufacturers and Dealers in Cotton and Woolen Machinery of every description. Card Clothing, Belting, etc. New York Office 91 Maiden Lane. 24 4*

GREAT ECONOMY IN FUEL IS OBTAINED by CARVALHO'S IMPROVED STEAM SUPERHEATER, Priming is prevented, and PURE Steam furnished to the Engine. Highly superheated steam, of any temperature, for Manufacturing or Chemical purposes, produced when required. Is easily attached and very durable. Address HENRY W. BULKLEY, 57 Broadway, N. Y. 24 4*

TO DYERS AND INK MANUFACTURERS.—The Cheapest form in which you can buy "Tannin" for making a Black Dye, or Ink is N. Spencer Thomas's Extract of Hemlock Bark. It also colors a beautiful Tan Color. Price only Ten Cents per pound. Send for a Circular. Address the Manufacturer,
N. SPENCER THOMAS,
21 2ow 6t* Painted Post, Steuben county, N. Y.

$150 A MONTH! NEW BUSINESS FOR AGENTS. [19 13*] H. B. SHAW, Alfred, Me.

THE CELEBRATED "SCHENCK" WOODworth Planers, with new and important improvements, are manufactured by the Schenck Machine Co., Matteawan, New York T. J. B. SCHENCK, Treas. JOHN B. SCHENCK,
17 13* Pres't.

NYE'S IMPROVED DAMPER.—THIS ARticle, just patented, is one of great practical utility, which every consumer wants, and which has been pronounced by the most scientific and practical men to be superior to anything of the kind before produced—being adapted alike to the Stove Funnel and Chimney Flue, and must meet an immense sale throughout the country. State, County, and Town Rights for sale. Apply to either of the undersigned.
S. R. NYE, } Barre, Mass
F. G. BATES, }
WM. H. HAMILTON. Petersham, Mass.
or H. CARRUTH & Co.,
25 4* 46 Hanover street, Boston.

FOR SALE CHEAP.—One of the celebrated Root & Benjamin Engines, 15 Horse-Power, in complete order, and occupies but little room. Can be seen running for a while at the premises of the undersigned.
BUCKBEE & BROWN,
1 tf Coxsackie, N. Y

ANDERSON & SCHERMERHORN, PATENT and Model Makers, Gearing Cocks, Valves, and Engines Patterns of every description. Rear No. 47 Ann street, New York second floor, 1 tf

$1500 PER YEAR, paid by SHAW & Clark, Biddeford, Me., or Chicago, Ill. 19 13*

WOODWORTH PLANERS, BARLETT'S Patent Power Mortise Machine, the best in market. Woodworking Machinery, all of the most approved styles and workmanship. No. 24 and 26 Central, corner Union street, Worcester, Mass. [17 11*] WITHERBY, RUGG & RICHARDSON.

IMPORTANT TO RAILROAD TRAVELERS. THE PORTABLE RAILWAY HEAD-REST or POCKET-BERTH. Patented July 4th, 1865 SUBSTANTIAL, SIMPLE, COMPACT. By means of the above invention, Railroad travelers may sleep at their pleasure, and ride days and nights continuously without experiencing fatigue. To Railway Companies, Railroad Agents, and Hotel Proprietors a liberal discount is made. Agents wanted in all the principal cities. Address JOHN R. HOOLE Selling Agent, [19 13*] No. 124 Nassau street, New York.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York.

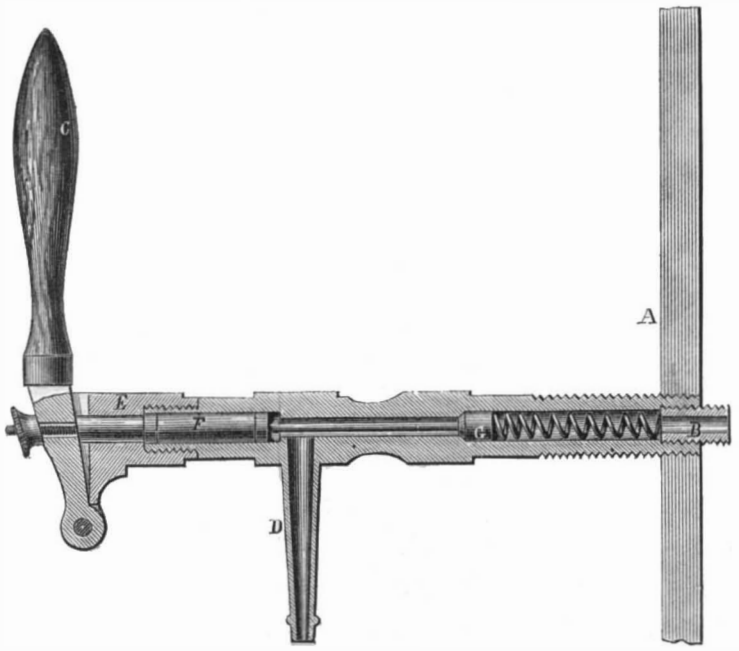
© 1866 SCIENTIFIC AMERICAN, INC.

Improved Gage Cock.

The common try-cock for steam boilers is similar in construction to the faucet, or is operated by a button in the line of the barrel, the pressure of steam or a spring returning the valve to place. The engraving illustrates an improved gage cock which is easily understood. A represents the front of the boiler into which the cock is screwed. B is a hollow screw plug to admit the steam or water, which, by the movement of the lever, C, is discharged through the pipe, D. E is a stuffing-box, or cap, provided with a projection, with rule joint, to receive the end of the lever. The plunger, F, fits the chamber, so that its movement forward closes the aperture in front of the delivery pipe, and obviates the necessity of close packing.

The operation is perfectly simple. By a pressure on the lever the valve, G, is opened, and on the removal of the pressure the coiled spring returns it to place, if there is no adequate pressure of steam. The view is that of a horizontal section, and can be understood by any mechanic.

Patented through the Scientific American Patent Agency, May 15, 1866. Address, for further information, Frederick Henke, Scranton, Pa.



HENKE'S GAGE COCK.

Improved Journal Box.

The waste of oil by the overflow of journal boxes, the annoyance of drippers, and the loss and inconvenience by the upsetting of the oil receptacles, comprise together a source of much trouble and vexation in every manufactory using shafting. Added to this is the time required daily in proper attention to the journals of shafting. A self-lubricating box, therefore, which requires but little attention, and which obviates the necessity of using dripping tins, would be a valuable improvement.—Such is the design here illustrated.

A, Fig. 1, is the case of the box, and B, Fig. 2, is the lower half of the box proper. It will be noticed that the case or shell projects much further below the shaft than the cap, C, does above it. The space between the bottom of the shaft and the innel lower surface of the shelr is an oil receptacle, i'u tended to receive the lubricator. The cap, C, is the top of the box proper and is lined, as is B, with Babbitt metal or other anti-friction material. The box is not so long as the shell, leaving a space at either end, which is covered, at D D, with a hood held in place by a movable pin passing through the top of the bead, E. These end hoods or caps can be removed at will to examine the bearing and replenish the receptacle or reservoir.

This is the general construction of the box and its parts. The means of lubricating are wicks, shown at F and G. Through the bottom of the box, B, are three or more cylindrical holes, connected with a semi-cylindrical score, to receive round wicking, which passes through the holes, and, by capillary attraction, raises the oil. To further insure perfect lubrication, a piece of flat-braided wicking or other suitable material, is laid along on the ridge at G, and connects by cored ports, shown at G and H, following the contour of the box, with the reservoir. Any overflow of the oil passes out at the ends of the box into the inclosed spaces between them and the ends of the shell, and is again deposited in the reservoirs. It will be seen that the lubricated portion of the shaft is kept closed against the admission of dust. It is claimed that when worn, the lower part of the box can be adjusted by the introduction of a piece of card board, tin, or sheet metal. On common shafting the supply of oil in the reservoir is said to be sufficient for six or eight months' consumption. In its application to saw arbors it will supply the bearings of a shaft running 400 turns per minute for from one to three days. These boxes can be mounted on swivels and adjusted to post bearings, hangings, pillow blocks, or in any other position desired.

Fig. 1

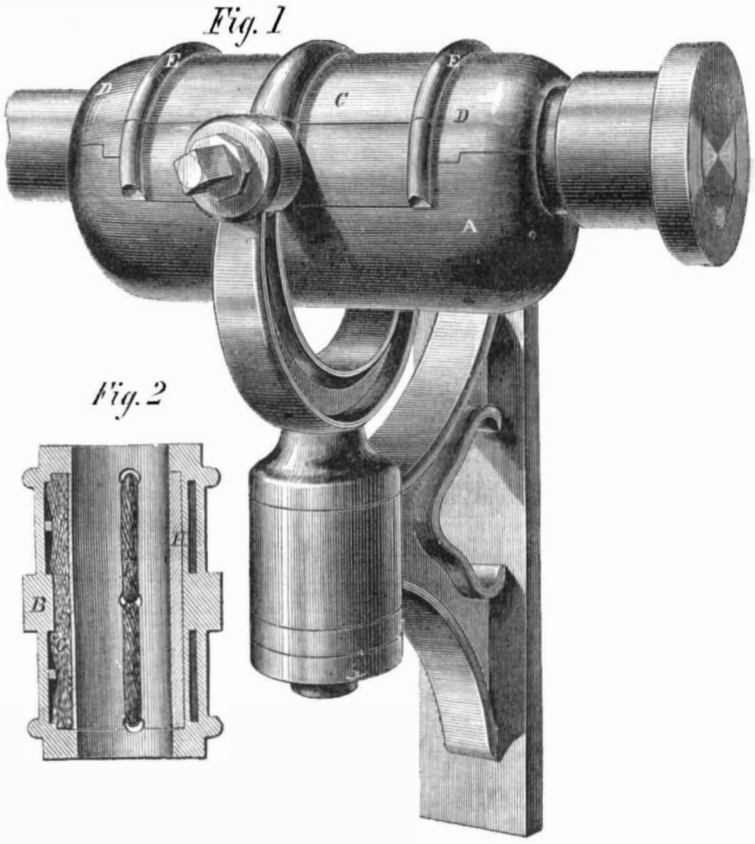


Fig. 2

SELF-LUBRICATING JOURNAL BOX.

Patented March 14th and Aug. 22, 1865, by Rice & Miller. For further information apply to M. J. Rice, assignee, No. 1,211 Washington street, Boston.

The "Galaxy."

One of the most brilliant periodicals that has appeared in a long time is the *Galaxy*. It is devoted to general literature, such as stories, narratives, biographies of men celebrated in art or science, and to such as are favorites of the muse of poetry it lends a willing but discriminating ear. Many of the names best known in modern literature are to be found in the *Galaxy*.

The *Galaxy* possesses many features that are novel and pleasing, and not the least is the Editor's peculiar department; he brings up the rear of the book, and styles his lucubrations *Nebulæ*—not a happy name, for they shine with no faint light, but with a steady and abiding radiance.

We publish on another page an article on the Spectroscope, by Prof. Draper, which is taken from the *Galaxy*, and our readers will thus have a chance to taste its quality. It appears every fortnight in a brilliant dress of brown and gold, and is already a permanent institution in the world of magazinedom.

University Law School.

On Tuesday the 19th ult., the graduating class of the Law School of the University of the City of New York were admitted, by the Supreme Court, to practice as Attorneys and Counselors at Law. The examination of the students occupied the greater part of five days, and was held before a committee appointed by the Supreme Court of this State. The commencement exercises were held in the large chapel of the University on the evening of the 19th, and the degree of Bachellor of Laws (LL. B.) conferred upon the graduating class.

We understand that Prof. J. N. Pomeroy, Dean of the Law Faculty, intends, in addition to the usual course of study, to introduce a course of instruction in Patent Law. This will be a new feature in our law schools, and one which we hope will be successful. The practice of patent law has grown to be a distinct and important branch of the legal profession, and any one attempting to practice it needs to be well instructed.

It is in contemplation to build a new and costly Executive Mansion on the high grounds east of the Capitol, and turn the White House into a fire-proof building for the State Department.

MECHANICS

INVENTORS, MANUFACTURERS.

The SCIENTIFIC AMERICAN is the largest and most widely circulated journal of its class in this country. Each number contains sixteen pages, with numerous illustrations. The numbers for a year make two volumes of 416 pages each. It also contains a full account of all the principal inventions and discoveries of the day. Also, valuable illustrated articles upon Tools and Machinery used in Workshops, Manufactories, Steam and Mechanical Engineering, Woolen, Cotton, Chemical, Petroleum, and all other Manufacturing Interests. Also, Fire-arms, War Implements, Ordnance, War Vessels, Railway Machinery, Electric, Chemical, and Mathematical Apparatus, Wood and Lumber Machinery, Hydraulics, Oil and Water Pumps, Water Wheels, Etc.; Household, Horticultural, and Farm Implements—this latter Department being very full and of great value to Farmers and Gardeners, articles embracing every department of Popular Science, which every body can understand and which every body likes to read.

Also, Reports of Scientific Societies, at home and abroad, Patent Law Decisions and Discussions, Practical Recipes, Etc. It also contains an Official List of all the Patent Claims, a special feature of great value to Inventors and owners of Patents.

Published Weekly, two volumes each year, commencing January and July,

Per annum.....$3 00
Six months..... 1 50
Ten copies for One Year.....25 00

Canada subscriptions, 25 cents extra. Specimen copies sent free Address

MUNN & CO., Publishers,
No. 37 Park Row, New York City

Messrs. MUNN & CO. have had twenty years' experience in procuring Patents for New Inventions. Inventors who may have such business to transact can receive, free, all needful advice how to proceed.

FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.

© 1866 SCIENTIFIC AMERICAN, INC.